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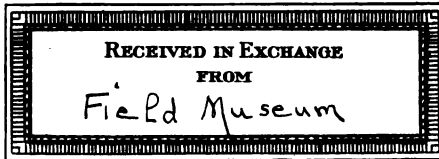
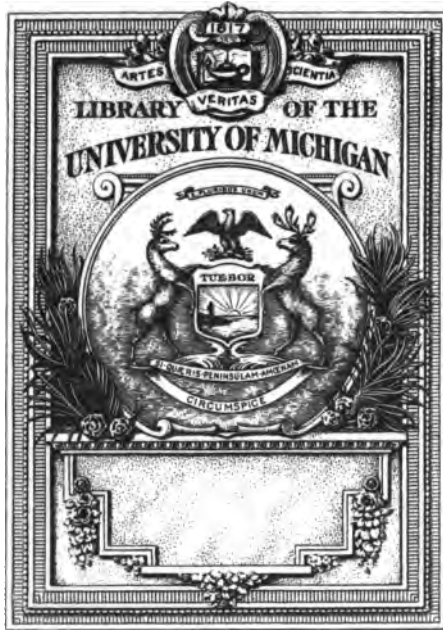
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SIXTH ANNUAL REPORT

OF THE

STATE MINE INSPECTOR

OF THE

STATE OF MISSOURI. *Bureau of mines
and mine inspection.*

FOR THE

YEAR ENDING JUNE 30, 1892.



JEFFERSON CITY, MO.:

TRIBUNE PRINTING COMPANY, STATE PRINTERS AND BINDERS.
1892.



Encl.
Field Museum
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LETTER OF TRANSMITTAL.

STATE OF MISSOURI, }
OFFICE OF STATE MINE INSPECTOR. }

To the Hon. W. C. HALL, Commissioner of Labor, Jefferson City, Mo.:

SIR—In accordance with section 7072, Revised Statutes of 1889, I have the honor to submit herewith the Sixth Annual Report of this Department for the year ending June 30, 1892.

It affords me much pleasure to be able to state that we have had another year of comparative peace between mine operators and miners, only a few strikes having occurred at mines, and those adjusted without violence. In fact, there seems to be less dissatisfaction between miners and mine operators than there has been for several years.

The coal industry was never in a more healthy condition than it has been during the past year, the output exceeding that of the preceding year nearly 14 per cent.

The lead and zinc industries are also showing a remarkable increase with each succeeding year, while the iron product still continues to decrease.

This report, like others from this Department, contains statistical tables showing the production of coal, zinc, lead and iron of each county, together with the number of men employed in each industry, also the method of working and the general condition of each mine at date of inspection, and such other information as will, I trust, be of value to those interested in mining.

Much of whatever success has been accomplished in compiling statistical matter contained in this report is due to Mr. J. W. Marsteller, who has faithfully and diligently performed his duty. I also desire to thank you and your clerks for the numerous valuable services rendered me in my official work.

Very respectfully,

O. C. WOODSON,
State Mine Inspector.

REPORT.

This is the Sixth Annual Report of its kind compiled for the State, and the results, as will be seen by reference to the accompanying tables, will, we believe, prove far more gratifying to those interested in the welfare of the State and its rapid developement in the mining industries than either of the preceding ones. The year that has just closed has been one of exceptional activity, and the increased prosperity in all of the mining industries, except that of the iron, has been most marked. The indications for the coming year bear every evidence that a similar era of prosperity is assured us.

The harmonious relations existing during the past year, with so little friction between the operators and employes, and with no acts of violence or lawlessness to report, afford us much pleasure.

With this report statistical tables covering numerous details associated with mining operations, under the several heads of coal mines, lead and zinc mines, and iron mines, will we trust be found not only complete, but entertaining as well. The data from which these tables have been constructed represent 1144 mines. Every effort has been employed which we could command to secure the exact facts, and so record them. The labor required in securing this information, verifying the same when received by comparisons and calculations, then collating the same in the shape it is found in accompanying tables, together with the other duties required of the Inspector of Mines, occupied his time most fully every day, and night in many instances. Each one of the large number of operators was either called upon in person for the data furnished, or blank schedules upon which to make his report were mailed him. Quite a number required a third request before complying. But the great majority of operators aided us greatly by the very prompt and intelligent manner in which their reports were made and sent in. Many of their answers to our questions have been made in such manner as characterized a disposition on their part to

not only assist us, but to encourage us in our work. To all of these we acknowledge our obligations and return sincere thanks.

The table following this is a summing-up of general results from all the mining industries of the State. By reference to the same, it will be seen that for the year ending June 30, 1892, the total receipts from the mineral product amounted to \$9,116,940, as against receipts of \$8,896,995 for the preceding year. The difference between these two amounts does not reveal the true gain for the year just closed, for the following reasons: Heretofore, pig-lead, which brings a price nearly double that of lead ore, has been reported to us by several large companies and operators as the product of their respective mines, without reference to lead ore; hence the pig-lead has been included in our estimates at its larger price over that of ore. The sum of \$8,896,995 (last year's total) embraces the value of pig-lead. This year, only lead ore at its actual valuation at the mines is estimated.

One reason for the change is, that formerly it was misleading.

Another is that we feared it would be regarded as unfair to credit the product of one or two counties with the increased benefits derived from the sale of pig-lead, while many other counties received credit from the sale of the lead ore only. To make the comparison for the purpose of showing the actual gain of this year over last year, we must add to the \$9,116,940 the sum of \$358,416, which represents the difference between the pig-lead valuation, as turned in by several operators, and their valuation of the lead ore produced by them, and which ore only we have included in our tables. With this explanation we give as the true net gain of this year the sum of \$578,361. The gain for this year in the coal and lead and zinc industries amounts to \$655,420—the decline in the iron product reducing the net gain to the former figures.

Turning to other features connected with the mining operations for the year, we find some unpleasant facts to be recorded. The building-up of this large sum derived from the mineral product has cost injuries to 52 men, the lives of 38 others, causing 21 wives to become widows, 67 children to be made fatherless, and one life lost to every 404 men employed.

Another very important feature connected with the mines of the State is the very large number of people supported by them. There are 14,340 men on an average employed at the mines. At the modest ratio of four to one, this gives a population of 57,360 directly dependent on a livelihood from this source.

TABLE I—Summary of General Results from Coal, Lead, Zinc and Iron Mines in Missouri for the year ending June 30, 1892, compared with the year ending June 30, 1891.

	1891.	1892.	Increase over 1891.
Number of mines of all kinds.....	1,012	1,144	132
Total amount received for minerals at mines*.	\$8,896,995	\$9,116,949	*\$219,945
Total average number of all employes at mines	12,392	14,340	1,948
Total average number of miners.....	8,141	9,858	1,717
Total average number of other employes.....	4,251	4,482	231
Total number of men killed.....	30	38	8
Total number of wives made widows.....	18	21	3
Total number of children made fatherless.....	53	67	14
Total number of non-fatal accidents.....	55	52	.....
Average number of employes for each life lost	413	404	.....

*Last year pig-lead was embodied in the figures of this table at nearly double the price per ton of lead ore. This year only the lead ore is accounted for; the amount which should be added to make fair comparison and offset the pig-lead estimated last year, equals \$368,416, which, added to this year's total receipts from minerals, gives a grand total of \$9,475,366, or an increase in fact over last year of \$578,361.

From the following table a comparison may be noticed, showing the tonnage of lead, zinc, coal and iron for each of the past four years. The increase of lead, zinc and coal has been great, while that of iron has declined. For the first three years, as per table, coal has averaged a gain of 213,000 tons per annum, while the increase for the year just closed shows a gain of 367,267 tons, or an increase of gain over the gain of previous years of 72%. We are unable to make comparison of increase in the lead product, owing to the fact that pig-lead and lead ore cannot satisfactorily be separated in the three former years.

Zinc ore has made a wonderful jump since the report of 1889. The difference in the number of tons produced in 1889 and that of 1892 amounts to an increase of 49,287 tons, or a gain for 1892 over 1889 of 60%.

TABLE II—Comparison of the Tonnage of Lead, Zinc, Coal and Iron Mines of Missouri for past four years.

Pig Lead for 1892 is dropped out and only Lead ore accounted for.

	Pig Lead.	Lead.	Zinc.	Coal.	Iron.
1889	25,440	9,469	82,357	2,223,477	251,006
1890	20,451	12,909	100,248	2,437,399	232,835
1891	19,969	16,925	123,752	2,650,018	138,356
1892 .....	.....	49,626	131,498	3,017,285	126,521

The coal industry has steadily increased year after year. No period in the history of the State has shown the progress that this year develops.

The increase shown by this report over the preceding year amounts to 367,267 tons, or very nearly 14% of the entire tonnage of the year before. This is indicative of increased population, as well as demand from other sources. As the output is governed by the demand, yet, if the necessity should arise for double the amount of coal produced last year, we feel confident that in a short time our mines would meet such increase without embarrassment. There has been a good demand in almost all the mining sections of the State for miners, and we are constantly in receipt of circulars from operators advertising for men.

The following table will show that there are now 454 mines in operation, an increase of 68. It also shows increases as follows: Ten steam-powers, 27 horse-powers, 17 shafts, 9 slopes, 28 drifts and 24 strip-pits. The table shows a decrease of 1906 kegs of powder as compared with last year, which is a gratifying showing when it is remembered that much more coal has been mined during the year. It will be found that there was an average of 9699 men employed in winter, and an average of 6419 in summer. There were 20 fatal and 41 non-fatal accidents. The total number of tons mined amounts to 3,017,285. The total amount received for same at the mines amounts to \$3,825,828.57. The average price received per ton at mines was \$1.268, or a decrease from the price received last year of 4½ cents.

TABLE III—Recapitulation of General Results of Coal Mines in Missouri for Year Ending June 30, 1892, Compared with the Year Ending June 30, 1891.

	1891.	1892.	Inc. or dec. compared with 1891.	
			Inc.	Dec.
No. of counties reporting on coal produced...	37	33	.....	4
No. of mines, including strip-pits.....	385	454	69	.....
No. of mines employing 10 or more men.....	141	165	24	.....
No. of fans in use.....	42	49	7	.....
No. of tons of coal produced.....	2,650,018	3,017,285	367,267	.....
Amount received for total output of coal....	\$3,480,867	\$3,825,828	\$344,961	.....
Amount received per ton for coal at mines....	\$1 31½	\$1 26.8	.....	.04 55
Total No. of men employed in winter.....	8,104	9,699	1,595	... ..
Total No. of men employed in summer.....	5,654	6,419	765	.....
Total No. of miners employed in winter.....	6,541	8,563	1,122	.....
Total No. of miners employed in summer....	4,433	4,934	501	.....
Total No. other employes employed in winter.	1,563	2,036	473	.....
Total No. other employes employed in summer	1,221	1,495	274	.....
No. of kegs of powder used.....	55,356	53,450	.....	1906
Total cost of powder.....	\$119,504	\$116,146	.....	\$3357
No. of men killed in coal mines.....	18	20	2	.....
No. of wives made widows.....	11	13	2	.....
No. of children made fatherless.....	41	46	5	.....
No. of non-fatal accidents.....	32	41	9	.....
No. of tons coal mined for each life lost.....	147,223	150,864	3,641	.....
No. tons coal mined for each non-fatal accident	82,813	73,592	.....	9221
No. new mines opened (small mines not incl.).	17	23	6	.....
No. of mines worked out or abandoned.....	5	10	5	.....

NEW COAL MINES OPENED

AND OLD ONES WORKED OUT OR ABANDONED.

During the past year there have been 23 new coal mines opened in the State, some of which are very important, while only ten have been worked out or abandoned, thus showing an increase of 13.

This, however, does not represent all the new mines, but only the more important ones. Indeed, there are so many places throughout the State where coal is mined in a small way at intervals, that it is a matter of impossibility for one Inspector to keep track of them all. For instance, a farmer may open a small mine upon his farm, and operate it for six or eight months, then abandon it without the inspector's knowledge. But such small local banks are not included in the following table, nor are mines included that are temporarily idle.

It will be observed by a glance at the table that some of the mining companies have only worked out one mine to open another. This fact, together with the number of new mines opened, is evidence that the coal industry of the State is in a healthy condition. The report also compares favorably, in this respect, with the one for the preceding year; that report showed seventeen new mines to have been opened and five worked out or abandoned, while this one shows ten to have been abandoned. Yet it also reveals the fact that an increase of six mines has been added.

Lafayette county comes to the front with five new openings, this being the greatest number of new mines opened in any one county, while she reports only one mine as being abandoned. Henry county comes next with four new mines and two abandoned ones. Then comes Macon county reporting three abandoned and three new ones opened. Bates, Ray and Vernon each have two new openings, while Bates reports four as being worked out. Audrain, Callaway, Jackson, Linn and Saline each report one new mine as being opened, but none abandoned.

TABLE IV—Showing mines opened, also those worked out or abandoned, during the year ending June 30, 1892.

County.	New mines opened.	Worked out or abandoned.
Audrain.....	Martinsburg Coal Co.....	.....
Barton.....	.....	Western Coal and Mining Co.
Bates.....	Blue Lick Coal Mine Co.....	Western Coal and M. Co. No. 2.
Bates.....	Mascot Coal Mine Co.....	.....
Bates.....	.....	F. M. Martin.....
Bates.....	.....	Keith & Perry C. Co., M. No. 5.
Callaway.....	Fulton Fire-clay Mine Co.....	.....
Henry.....	Blair Diamond Mine.....	Blair Diamond Mine.....
Henry.....	Dunlap Coal Co.....	.....
Henry.....	Baldwin & Fonda Coal Co.....	Baldwin & Fonda Coal Co.....
Henry.....	B. L. Owen.....	.....
Jackson.....	Kansas City Clay and Coal Co...	.....
Lafayette.....	Corder Coal and Coke Co.....	.....
Lafayette.....	Farmer Coal Co.....	Farmer Coal Co.....
Lafayette.....	S. Riley.....	.....
Lafayette.....	Francisco Coal Co.....	.....
Lafayette.....	Waverly Coal Co.....	.....
Linn.....	R. F. Landrith & Son.....	.....
Macon.....	Kansas & Texas Coal Co., M. 46.	Kansas & Texas C. Co., M. 26.
Macon.....	Kansas & Texas Coal Co. have also opened one or two small mines at Ardmore.....	Kansas & Texas C. Co., M. 42. Oakdale Coal Co.....
Ray.....	Murray & James.....	.....
Ray.....	Bissell Coal Co.....	.....
Saline.....	R. M. Cordell.....	.....
Vernon.....	Keith & Perry Coal Co.....	.....
Vernon.....	Frank Williams & Co.....	.....

IMPROVEMENTS MADE IN COAL MINES.

In a table below is given a summary of the principal improvements made in and about the coal mines of the State during the past year. It must be understood, however, that these improvements are not a part of the new plants erected, but represent only those made at mines which were in operation heretofore.

Many of the large companies sink escape-shafts, build railroad switches and erect a fan at the same time they are sinking hoisting-shaft. In such instances no mention is made in the report of these improvements, but it is simply given as a new plant.

For instance, the table shows eight mines to have been equipped with machinery; now should we include the nine new steam plants which have been put in operation during the past year, the figures would be a little misleading.

The good work of giving more attention to ventilation is growing each year in the State, as a glance at the following table will show. The erection of four new fans to take the place of furnaces, besides the three fans which were replaced at mines by larger ones, speaks well for the ventilating appliances added during the year, to say nothing about

the four fans erected at new mines. Another important feature of the table is the number of over-casts made in order to split the air-current. But very few over-casts were used in the mines of our State a few years ago, and even now we have mine bosses who contend that they can get the best results by carrying the air around the entire workings in one continuous current. Fortunately there are but few of this class of foremen in the State, and the time is not far off when they will disappear altogether and give room for the more intelligent who study these questions.

It is also interesting to note that eight second openings and three air-shafts have been made during the year, and that two more are under way of construction.

TABLE V—*Showing summary of Improvements made in and about Coal Mines during the year ending June 30, 1892.*

Railroad switches put in.....	3	Cages rebuilt.....	4
Hoisting engines erected.....	8	Over-casts made.....	5
Wire ropes put on cages.....	5	Fans erected to take places of furnaces	4
Second openings made.....	8	Small fans removed and large ones erected.....	3
Ventilating shafts sunk.....	3	Boilers erected.....	3
Second openings being made.....	2	Shaking screens put in.....	2
Ladders or stairways built.....	3		

Detailed Statement, by Counties, of the Principal Improvements Made in and About Coal Mines During the Year Ending June 30, 1892.

County.	Name of Company.	Improvement made.
Andrain	Vandalia Coal Co.	Sinking escapement shaft.
Bates	Hines Bros.	Railroad switch put in.
Bates	Rich Hill Coal M. Co.	New cages put in at No. 15; air and escapement-shaft sunk and an overcast put in; hoisting shaft retimbered at No. 2.
Bates	J. M. Wise	Hoisting engine erected.
Boone	Columbia Coal Co.	Wire ropes put on cages.
Caldwell	Caldwell Coal Co.	A 10-foot fan erected; new wire rope put on cages; sinking escapement shaft.
Caldwell	Cowgill M. Co.	Engine house and tippie erected.
Caldwell	Hamilton Coal Co.	New boiler-house erected and an overcast made in mine.
Caldwell	Kingston Coal Co.	Hoisting engine erected.
Grundy	Grundy County Coal Co.	Hoisting engine erected.
Henry	Baldwin & Fonda Coal Co.	Eight-foot fan erected; escapement shaft under way of construction.
Henry	Co-operative Coal Co.	Escapement shaft sunk.
Henry	Black Diamond mine.	Escapement shaft sunk.
Lafayette	Lafayette Coal Co.	Air-shaft sunk and furnace erected.
Lafayette	J. C. McGrew	Ten-foot fan erected.
Lafayette	Henry Macey	Air-shaft sunk and furnace erected.
Lafayette	Mayview Coal Co.	Hoisting engine erected.
Lafayette	Missouri River C. M. Co.	Hoisting engine erected.
Lafayette	Rocky Branch Coal Co.	An extra switch, connecting mines with Missouri Pacific railroad, put in.
Lafayette	Stealy & Fowler Coal Co.	Steam boiler at No. 1.
Lafayette	Wellington Coal Co.	Escapement shaft made.
Macon	Bevier Black D. Coal Co.	Twelve-foot fan put in.
Macon	Kansas & Texas Coal Co.	Shaking-screen put in at No. 33; new hoisting engine erected and slope widened to 12 feet and much improved; a new shaking-screen at No. 43; a number of new dwelling-houses erected at the different mines.
Macon	Little Pittsburg Coal Co.	New ladder erected in escapement shaft and a 12-foot fan put in; also overcast made and wire ropes put on cages.
Macon	Watson Coal Co.	New cages built and wire ropes put on cages.
Macon	Loomis Coal Co.	Safety catches repaired at No. 1.
Putnam	Blackbird Coal Co.	Hoisting engine put in; escapement shaft sunk; 9 dwelling houses and a store erected.
Putnam	Mendota Coal Co.	An air-shaft sunk at No. 1.
Randolph	John Breckenridge	Escapement shaft at No. 1½; 12-foot fan at 3½.
Randolph	Higbee Coal & M. Co.	Fan remodeled; cages rebuilt; a new boiler erected and an over-cast made in mine.
Randolph	Interstate M. Co.	Stairway erected in escapement shaft; air split into four currents; an overcast put in and 4 railroad shutes erected.
Ray	Cravin Coal Co.	Hoisting engine erected.
Ray	Kansas & Texas Coal Co.	Ladders renewed in escapement shaft; cages repaired and new wire ropes put on cages.
Ray	Richmond Coal Co.	Cylinder boiler put in.
Sullivan	Milan Land & C. M. Co.	Railroad switch put in.
Vernon	Keith & Perry Coal Co.	Escapement shaft sunk; 14-foot fan put in.

VENTILATION OF MINES.

I do not propose to discuss the subject of ventilation, but to call attention to a few important points, as the subject is probably of as much importance to the workmen and operator as any other relating to the operation of mines. In a well-ventilated mine men can do more work, consequently the output is greater; therefore, not only is the miner benefited, but the operator as well. This is not the only way operators are benefited by good ventilation; it is true, that the foul air does not affect his health as it does the miner, but it causes the timbers along the air-ways to decay much sooner than they would had the mine been well ventilated, which adds continual expense, cleaning up and retimbering air-courses. Most practical miners know that timbers decay in a return air-course much sooner than they do on the inlet; this is caused by large quantities of carbonic acid gas, contained in the return air. I am glad to be able to state, however, that in the past few years, mine operators and managers are, as a rule, paying more attention to the subject of ventilation than they have ever done before. During the past year a number of them have erected new fans at their mines to take the place of furnaces, and a few small fans have been replaced with large ones. But the mere fact that a mine is equipped with a good fan or furnace does not insure good ventilation. A great deal depends upon the efficiency of the mining boss in this respect. It is his duty to see that the air-current is properly forced and circulated to all workmen throughout the mine, and in order to do this, he must keep a constant watch over the air-courses, brattices, stoppings, doors, etc., and use proper judgment in its distribution.

I have often taken measurements of the air near the downcast or inlet, and another near the working face, and found that more than one-half of the air that entered the mine was lost before reaching the workmen, by leaking through stoppings, doors and brattices. Results of this character are more likely to occur in mines where large quantities of powder is used than in mines worked by pick, as the concussion from shots shakes down and disturbs the stopping to a great extent. I well remember the first stopping I ever built in close proximity to heavy blasting. It was made of shale and fine dirt, and I thought strong enough to stand for all time to come, but in a few days, to my astonishment, the shots had completely shaken it down. I there learned my first lesson of the effect heavy blasting had upon stoppings.

As already stated, mining bosses should see that the air is forced and circulated to each workman. This is an easy matter in long-wall work, but in pillar-and-rooms, it is quite different. In the former the

whole volume of air passes along the face, but in the latter the workmen are always ahead of the ventilating current—it not being practicable to force the air around the face of coal under this method of working. But in many instances which have come under my notice, the mining boss, by a little work and a few yards of brattice-cloth, could send a fair current of air through rooms which had been driven in a long way from the entry, by placing a canvas door across the entry at the mouth of room, much to the relief of the miners.

POORLY CONSTRUCTED FANS.

I desire to call attention to a few mistakes made by mine officials in the construction of ventilating fans, which have come under my notice during the past year or two. Some mine officials locate their ventilating fan at the top of hoisting-shaft, a part of which is bratticed off and used as a ventilating chamber, and it often occurs that the wooden brattice work of which it is constructed shrinks, leaving cracks through which the air passes and returns to the surface, without even reaching the bottom. Upon calling the attention of mining foremen to this fact, they have frequently asserted that they did not know that the deficiency existed, notwithstanding it is a part of their duty to see that the ventilating current is forced and circulated to all parts of the mine in sufficient quantities to remove all noxious gases, and to see that the mine is in a healthy condition. It seems to me that some mining bosses do not fully realize the responsibility which rests upon them; if they did, such gross neglect as the above would not have to be recorded.

Air chambers constructed in connection with hoisting-shafts are often too small to insure good results, and it sometimes occurs that a 10 or 12-foot fan will be located over an air chamber not more than 24 to 30 inches wide, and, of course, the width of the shaft, which is generally about seven feet—thus giving an area of from 14 to 17½ feet, and any one who has ever given this subject any thought knows that a fan cannot give proper results under these circumstances.

Poor carpenters and worse lumber are often responsible for imperfectly constructed fans. By a close examination of some of them, it will be seen that the spiral casings are leaking, and that not enough space has been left to either receive the air or to discharge it, and it sometimes occurs that the fan is erected in such a manner as to receive air only at one side. Such mistakes as these should be avoided by all means, as a fan working under such condition is exerting useless power, using extra steam and wearing out machinery without giving the results required or expected of it.

Not long since I was making an inspection of a certain mine, at which a 10-foot fan built by Crawford & McCrimmin had recently been erected. After passing through most of the workings, I complained to the mining superintendent that the air was inadequate, which led to an examination of the air-courses. While they were not as large as they should have been, yet the obstructions did not seem sufficient to cause any serious trouble in the ventilation, so I came to the conclusion that the trouble was in the construction of the fan, and therefore made an examination of it, and found that in place of leaving an opening on either side of the fan-casing for the passage of air, a small hole was left in the spiral casing at the bottom, through which the air-current was expected to be drawn. The carpenter did not stop at this blunder, but put the vanes on with the curve turned forward in place of backward, as they should have been.

The superintendent and manager seemed surprised when I called their attention to these facts, and the mine superintendent asserted that he had seen a great many fans, both in this country and in Europe, but confessed that he had never paid any attention to their construction, nor had he ever given the subject any thought.

A manager of a mine should know all about the construction of a fan as well as the principle of ventilation, as the health and safety of a great many men may be depending upon his ability. If he does not thoroughly understand these matters, he should give them his earnest attention until he is efficient in all their details. The time is not far in advance when it will become necessary for a mining manager, and also the boss, to thoroughly understand not only the principle and theory of ventilation and construction of fans, but every other detail connected with the operations of mines. The manager or boss who do not know these things will be compelled to step down and give room for those who have kept pace with the times. There is a law in some of the states now, which requires mines superintendents and foremen to pass a rigid examination and secure a certificate of competency before they are permitted to hold a position over men at collieries. In my opinion these laws will soon be extended to other states, and I would advise our mine managers to give the subject careful consideration; certainly no good result can be expected either for the company or miners at a mine where an incompetent manager is employed.

HOISTING AND SIGNALS.

It is a recognized fact that cages, even with the most skillful engineers and best appliances, are a dangerous apparatus, and while all shafts are equipped with some kind of a code of signaling between the

bottom and top, some of these are very imperfect. While I do not believe a complicated code of signals would be a benefit at any mine, yet I think that they should be sufficient to be understood, and to this end I would suggest the following:

"One bell" from bottom to engineer, to hoist coal or empty cage, also to stop cage when in motion.

"Two bells" to lower cage.

"Three bells" to signify that men are coming up (no one should be allowed on cage until signal is returned from engineer, which should also be three bells); after signal is received from engineer, men can get on cage and ring one bell to hoist.

"Four bells" should signify to hoist slowly, implying danger.

If from any cause the engineer could not hoist the cage immediately after receiving signal from the bottom, he should, before hoisting, signal to the cage as a warning to stand clear of the cage.

If a code of signals had been in use in the mines of the State, they might have been the means of preventing several serious accidents which have occurred during the past three or four years. These accidents usually happens by the engineer being away from his engine when the bell is rung for him to hoist; the cager, or some bystander who may be on the bottom at the time, becomes impatient at the delay and attempts to cross the cage just as the engine is started, and is caught between curbing and cage, and is crushed.

In all deep shafts, where voices cannot be distinctly understood between the top and bottom of shaft, a speaking tube should be constructed for the purpose of conversing between the two points. While there are a number of these tubes in use in deep shafts in the State, yet there are a few companies that have not adopted them.

SAFETY APPLIANCES AT MINES.

We have often heard it said by experienced men that safety catches on cages do but little if any good, and in some states the inspectors have such little faith in them as a safeguard that they do not require operators to put them on the cages, claiming that the officials will continue to use an old rope after it is in bad condition, depending upon the safety catches in case the rope should break. While there may be a great deal of truth in this statement, our experience has taught us that safety catches are a valuable appliance, when kept in good condition, and have been the means of saving several lives at mines in our State during the past five years. For illustration: last January 11, what might have been a very serious accident occurred at mine No. 1,

owned by Loomis Coal Co., located at Bevier, if it had not been for safety catches.

It seems that August Hildebrant, Jas. E. Jones and John S. Griffith got in the cage at the top landing in tip-house, and were lowered down to the first landing, when Wm. D. Lewis got in. The signal was then given to the engineer to let the cage down; but instead of letting it down, he hoisted it up until the cage struck the sheave-wheels, where the rope broke, letting the cage drop, but fortunately the cage did not fall many feet, for the safety catches caught the guides and stopped it. While this showed great carelessness on the part of the engineer, and for which he was promptly discharged, it proves that the safety catches are a safeguard that should not be dispensed with, although they should not be relied upon entirely: that is to say, a company should not continue to use a defective rope because their cages are equipped with good safety appliances, as it is a matter of fact that in many instances safety catches, from some cause, have failed to operate when ropes have been broken.

The mining boss should examine not only the safety catches, but the cages, ropes, sheave-wheels, and in fact every part of the hoisting appliances, every morning, to see that everything is in good working order, and if some deficiency is observed, he should see that it is remedied at once. The miner's occupation is hazardous at best, and every precaution possible should be used to protect him while going to and from his work.

DOORS IN MINES.

During the past year a number of doors for controlling the air-current in mines have come under my notice that were not only poorly constructed but were not properly hung, some of them being built of inch pine lumber, and hung in such a manner that the air-current would partly hold them open. Now, all doors, more especially those on main roadways, should be made double and hung so as to open against the air-current. In this way the pressure of air upon the door will help to force it closed. They should be made to fit the frame as well as possible, but as it is a very hard matter to make and keep a door in a mine tight, a piece of brattice-cloth can be nailed at the top and bottom to prevent leakage. It is an absolute necessity to keep a trapper boy at all main doors through which any great quantity of coal is hauled, to open them for the trip to pass and to see that they are promptly closed again. Otherwise a block of coal may fall off a car and hold a door partly open for several minutes, which means that a group of miners in some part of the mine are not receiving their proportion of the air-current. Canvas doors should not be used where

the air-current is strong, as the pressure of the wind will hold it up and permit a large per cent of the air to escape. In such cases a strong wooden door should be put up, although the canvas doors do very well to force a moderate current of air around the heads of room workings or cross entries where the distance is not too great. They are also very effective near the working face in mines where a great deal of powder is being used, as the concussion from the shots does not disturb them, while a wooden door in the vicinity would be shattered to pieces very soon by the heavy blasting.

BOYS IN MINES.

Section 7066, Revised Statutes of 1889, contains the following: "No male person under the age of 12 years, or female of any age, shall be permitted to enter any mine to work therein; nor shall any boy under the age of 14 years, unless he can read or write, be allowed to work in any mine. Any party or person neglecting or refusing to perform the duties required to be performed by the provisions of this article shall be deemed guilty of a misdemeanor, and punished by a fine in the discretion of the court trying the same, subject, however, to the limitations as provided by section 7070 of this article." This section imposes a fine of from \$100 to \$300.

The question now arises, how is a mine inspector, under the above law, to ascertain a boy's age? He can question the boy and his parents, but if they see fit, they can make false statements in regard to the boy's age, and thus evade the law. An exemplification of this was brought to my notice not long ago while on a tour of inspection in Lafayette county. While going through a certain mine I found a very small boy working, and asked him his age—which is my custom when finding a small boy in a mine—and he informed me that he was only 11 years old; whereupon I notified him to go home and tell his parents to send him to school. On returning to the surface I met his father, who acknowledged that the boy was only 11. But later in the day that gentleman looked me up and affirmed that he had consulted his wife in regard to the matter, and that the boy was over 14.

In cases of this kind, what is to be done? We may be confident in our own mind that the former statement was true and the latter false, but not having evidence to that effect, we can do nothing. It is a common occurrence to hear miners complain that small boys are employed in the mines, but upon investigation it is generally found that the boys are of lawful age, or the investigation results as the one referred to above. If a boy who is under 14 knows that the Mine Inspector is in the mine, it is an easy matter for him to hide until the Inspector has

passed. They are as a general rule an intelligent class, and up to all such tricks. I have mentioned these facts to give some idea of the difficulties under which the Mine Inspector labors, and in conclusion I would suggest that the above section be so amended as to give the Inspector the power to take evidence to ascertain a boy's age found working in a mine, or the parents be compelled to make an affidavit of the boy's age before he should be permitted to enter a mine for the purpose of working therein, and a copy of such affidavit be kept on file in the office of the company. If this was done, it would doubtless be of great benefit to many boys growing up who are kept from school to help their fathers in the mines.

ANONYMOUS LETTERS.

During the past year a great many anonymous letters have been received at this office from different places throughout the State, signed "mining committee" or "miner." Such letters soon find their way to the waste-basket, as we do not give them any attention.

If a mine inspector should give his attention to such complaints, it would not be long until the office would be flooded with letters of like character, many probably coming from some parties desiring to cause unnecessary trouble, on account of having a grievance with the superintendent or manager. If a miner desires to make complaints against a company, he should not be ashamed or afraid to sign his name to the letter, and if he is working in a poorly ventilated mine, or sees the law being violated, whereby the health and lives of the workmen are endangered, it becomes his duty as a good citizen to notify the Mine Inspector of the fact, for by so doing he would confer a favor upon this Department, as well as his co-workmen, as it would be the means of leading to an investigation, and probably an adjustment of the trouble, thus preventing accidents such as are recorded every few months in some part of the country.

Some miners are of the opinion that as soon as a complaint is made to the Mine Inspector, he immediately notifies the company who the parties are complaining, and that the superintendent will either discharge or treat them with contempt in the future.

I desire to state to all such miners that those ideas are erroneous, as far as the present Inspector is concerned, as not a single name of a party complaining to this office, over his signature, was ever revealed to the officials of a company, although I have been compelled to prosecute mine operators, time and again, for violating the law, and that at mines from which complaints had been made. Upon the receipt of a complaint of a workman or committee of miners, I immediately write

the superintendent or manager (provided, however, I can not visit the mine at once), stating the nature of the charge made against his company, and ask an explanation, and at the same time inform him that if the law is being violated, prosecution will follow. We also notify the complaining parties what has been done, and ask them to inform us what effort the company is making to adjust the trouble complained of; and in this manner we have been able to settle a great many difficulties and obtained many valuable improvements at mines, such as the erection of fans, increasing size of furnaces, making second openings etc., without having to resort to the courts.

MAPS OF MINES.

Section 7061, Revised Statutes of 1889, requiring mine operators to make and file a map or plan of their mine in January of each year, with the clerk of the county court in the county in which the mine may be located, and also file a copy with the State Mine Inspector, does not seem to be fully understood by a few mine operators.

During the past year I have received a few "imaginary" maps of mines from operators, drawn on a piece of common wrapping paper, with a lead pencil, with nothing upon them to indicate where the mines are located, and drawn to no scale. Such maps are of no use to this or any other department, and are either returned to the operator or cast into the waste-basket. There are a few mine managers, however, who are very prompt in filing maps, but neglect to have engineer show the boundary line of the property on them with reference to the underground workings.

It was evidently the intention of the Legislature to have a complete record of all mines in the State in which more than ten men are employed kept on file for public inspection in this office, and also with the clerk of the county court in the county in which the mine may be located, and I think the law should be faithfully complied with, as these maps will be valuable to parties in years to come, in locating the old workings of abandoned mines. For illustration, a certain company desires to open a new mine near an old abandoned shaft which had been worked out several years before. The first thing the manager would do would be to apply at the county clerk's or mine inspector's office to see the map of the abandoned mine; but if there was no map on file, or one such as I have described above, he would not only be at a loss to know what plan to adopt, but the operation of it would absolutely be dangerous to the workmen, for should they break a hole through into the old workings, they might be overcome by gases or the mine flooded with water.

We have often been applied to for information as to how a map of a mine should be made, and in order to give such parties information, would offer the following as a suggestion. To make a complete map, the engineer should first make a survey around the tract to be worked, locating all the principal buildings, railroad tracks and ravines, and make a topographical map of the tract; streams of water should be regarded as of primary importance, and should be located with exactness. After the surface survey has been made and placed, a survey should be carried into the workings, and the same care taken as on the surface to locate every pump, fault and pool of water. Take advantage of the second opening to carry the survey to the surface by a route different from that by which the mine was entered, and connect with the outside line. The map should be a ventilating chart and made on a scale of not more than 200 feet to the inch; mark the up-cast and down-cast plainly, and show the air-currents by arrows.

Mines can be worked more economically if maps are made upon this principle, for if a change is to be made in the air-current it can be planned on the map, and if it is desired to drive one entry through to connect with another, a calculation of the cost can easily be made by referring to the map; while streams of water or ponds are readily located and kept from finding their way into the mine.

STRIKES.

The coal industry of the State has been blessed with another year of comparative peace between mine operators and miners. While eleven strikes have occurred, none of them were of long duration. The Farmer Coal and Mining Company and Excelsior Coal and Coke Company's trouble were the longest reported, the miners at each mine being out 24 days, while the others were out from two to 20 days. However, the reported trouble at Corder Coal and Coke Company's mine is not included, and only one-half of a month's lost time is considered in the strike at Winsor Coal Company's mine, as most of the employes obtained work elsewhere before that time.

In these eleven strikes there were 677 men thrown out of employment, with an estimated average loss in wages to each of \$14.88, or a total loss of \$10,073.75.

During the same period last year ten strikes occurred, throwing 603 men out of employment, with an average loss to each of \$39.35, aggregating a total loss of \$23,730, or a little more than twice the amount in wages were lost in the year ending June 30, 1891, than there have been during the past year.

In these eleven strikes five were successful, three unsuccessful, and one, the Kansas & Texas Coal Company, we may consider compromised; and Winsor Coal Company we can also consider unsuccessful, as the property was sold after the strike under a deed of trust to other parties, who are now operating it.

STRIKES BY COUNTIES.

AUDRAIN COUNTY.

Vandalia Coal company—Miners struck November 15th for an increase from 86 to 92 cents per ton for mining. After being out two days, the company yielded to their demands, after which they returned to work.

BATES COUNTY.

Western Coal and Mining company—April 15, last, trouble arose between employes and employer over a check weighman, which resulted in a strike, after which the company declared the mine closed down. Ten days later, however, they again resumed operations, employing such of the old hands as they deemed proper.

J. M. Wise Coal company—March 23, a meeting was called by the miners on account of some dissatisfaction in regard to the method of weighing their coal, and, as they claimed, continual loss of boxes for which the weighman could give no account. At the meeting a committee was appointed to test the scales, on the following day. It seems that there was no work on the following day nor for several days thereafter; but when the miners were notified that work would be resumed, they met at the mine and were informed that the committee could not make an investigation of the scales, but that they could employ a check weighman if they so desired. A vote was taken among the miners, and it was decided to employ the check weighman in question, but the mine was again thrown idle in order for him to secure an affidavit before entering upon his duty. The following morning, however; the miners returned to work, and were instructed by the company, to clean up their coal in their working places; and we are informed that the company refused to receive a number of boxes on account of impurities contained in the coal—dumping them over the slate dump; this caused another meeting, resulting in the miners demanding that the coal be weighed by the company whether it be dumped in the railway car or over the slate dump. The trouble was finally settled after a two weeks' strike but the company either discharged or refused to re-employ several of the men.

GRUNDY COUNTY.

Grundy County Coal company—December 25, changed method of paying employes for mining at the new shaft, from day work to so much per bushel, whereupon the miners refused to accept the price offered,

and a strike followed; but after being out two weeks, accepted the price proposed by the company and returned to work.

LAFAYETTE COUNTY.

Corder Coal and Coke company—While I was inspecting mines in the vicinity of Lexington and other parts of the county, I met miners and other parties, who informed me trouble had arisen between the employes and company, resulting in a strike and closing down of the mine, thus throwing about 100 men out of employment. Upon coming to the subject of strikes in writing my report, I wrote the company the following letter:

CITY OF JEFFERSON, Aug. 11, 1892.

CORDER COAL & COKE Co., Corder, Mo.:

GENTLEMEN—Will you please furnish answers to the following questions relative to the strike at your mines:

First—Date of strike.

Second—Cause of strike.

Third—Duration of strike.

Fourth—How settled

Fifth—An approximate estimate of loss to miners by reason of the strike, together with such other information as you may see fit to give us.

Yours truly,

C. C. WOODSON,
State Mine Inspector.

To this letter Mr. Smith, superintendent, replied as follows:

CORDER, Mo., Aug. 12, 1892.

C. C. WOODSON, State Mine Inspector, Jefferson City, Mo.:

DEAR SIR—In reply to yours of the 11th inst., I beg to say that we have no strike at our mine, and consequently can make no pertinent reply to inquiries. About May 10, this last spring, we shut down, and will not open up till September 1 next, at which time we expect to resume work as usual. There is no controversy between us and the miners, and of course nothing to settle.

Very respectfully,

H. G. SMITH.

I was naturally somewhat surprised upon the receipt of this letter as I had been informed by so many parties about the trouble, and especially by one gentleman whom I know to be not only friendly to the company but also to its officials. So I again wrote Mr. Smith about the matter. The letter is as follows:

JEFFERSON CITY, Aug. 13, 1892.

H. G. SMITH, esq., Manager Corder Coal Co.:

DEAR SIR—Yours of yesterday to hand. The questions asked you in our previous letter were suggested by information furnished me while in Lexington, and also at Higginville, some weeks since. What I learned was in substance that the miners demanded increased pay for day men or pushers, and that you, rather than accede to their demands, closed down, etc. As we will have to mention it in our

report, it was our desire to state the case fairly, and secure from you your side of the question. The opportunity to make a statement will be open a few days, as I am now at work on my report.

Yours truly,

C. C. WOODSON,

State Mine Inspector.

To which he replied as follows:

CORDER, Mo., Aug. 14, 1892.

C. C. WOODSON, esq., State Mine Inspector, Jefferson City, Mo.:

DEAR SIR—Yours of 13th inst. is to hand, and in reply thereto, I beg to thank you for your kindness in keeping open for a few days an opportunity for me to state my "side of the question." But as there is no controversy between the miners and myself, I have no side to state. I could, and perhaps will, when opportunity presents, state to you the leading causes that induced the temporary closing of the shaft. To attempt to give you these reasons in chirographic characters this hot weather is too much of a task. Moreover, I have quite a curiosity to see how you will treat the subject in your forthcoming report, on the basis of information received in Lexington and Higginsville. You remember the old adage: Go away from home if you wish to get the news.

Very respectfully,

H. G. SMITH.

This left us exactly where we were before; so I concluded to get a statement from the miners in regard to the matter, and therefore wrote them, and received the following letter, which explains itself. Whether there has been any trouble at this mine or not is a matter I leave to the public to decide:

CORDER, Mo. Aug. 16, 1892.

C. C. WOODSON, State Mine Inspector, Jefferson City, Mo.:

DEAR SIR—Yours to hand 16th inst. I will give you a true statement of the cause of the strike at the Corder mines. The cause is not of the digging the coal, it is the wheeling of it. It has been a standing rule here that if a miner came out of his room to wheel coal, he got \$2.00 per day. On the 10th day of May they were short of wheelers—and as a general thing they are—so the pit-boss told the men that Smith would not pay any more than \$1.75 per day. Well, none of the men would come out of their rooms to wheel for that; they told the pit-boss to get wheelers for them and it would be all right. But they did not get wheelers; and they did not try; so the men came out that day to wait until they got wheelers. But the men concluded to go to work next day: they saw it was only a scheme of Smith to close down, for I knew it. I am check weighman, and the weigh-boss said Smith wanted to shut down. So the men went to work next day, but there was not enough wheelers; so they concluded to go home again. They said it was no use to sit down and look at one another. So as soon as the first cage full of men came up, the weigh-boss put up a notice saying, this shaft will be closed down for an indefinite period of time. Smith gave this notice to the weigh-boss the night before, saying, "As soon as the first cage full of men comes up, you put that up."

When the men saw that notice they did not know what to think about it. So I got the men together, and we had a meeting before dinner. The men thought it was an imposition put on them, because they had wheeled for the company when they had no day hands, and helped them out, and then for them to turn around and want to force it upon them, they thought it unjust. It was carried at the

meeting to send a committee to Smith and tell him it was no fault of the men; that the men were ready for work any time he put wheelers on. So the committee went and had an interview with Smith; I was at the head of the committee; so I told him just how the thing stood, and he said, "I don't care now;" he said if the men had accepted the \$1.75 now, I would not start anyhow, as there is no money in running in the summer. So he said to tell the men if they wanted their tools out, to get them out that afternoon, as he was going to draw the mules out. So the committee told the men, as many of them as they could see. He would not give the men a chance to square their rooms up; they had to leave all their coal in there, and not one-third of the men got their tools out. This is a true statement. A day or two after the meeting, Smith said it was the Knights of Labor that had done it. So the men said to him, how could it be? for all the men in the shaft was there at that meeting. Well, he said there is never steady work where this organized labor is. Now you can see who is on the right or the wrong side.

Yours truly,

FRANK HUNTER.

Excelsior Coal and Coke company—Company changed method of paying from every two weeks to semi-monthly, which resulted in strike May 1. Miners were out until the 24th, at which time they returned to work, succeeding in their demands.

Farmer Coal and Mining company—Miners struck May 1 against a proposed change in the method of paying from every two weeks to 5th and 20th of each month, succeeded in their demand and returned to work on the 24th.

Francisco Coal company—Miners struck about January 15th against a reduction from 3 to 2½ cents per bushel for mining. After being out eight days, the matter was compromised by the company paying 3½ cents per bushel for clean coal. Before strike coal was sent to the surface and paid for without being cleaned.

Winsor Coal company—Miners struck March 2 for non-payment of wages, and the mine was closed down May 5; property was sold under a deed of trust. At the time the strike occurred, about 50 men were employed. We are informed that some of the miners accepted 60 cents on the dollar for what was due them.

MACON COUNTY.

Kansas & Texas Coal company—Company changed method of paying employes from every two weeks to once a month, which resulted in a strike June 14, but on the 20th the miners returned to work. In the meantime they had notified the Labor Commissioner of the trouble and requested his assistance, and through the efforts of Governor Francis and Commissioner Hall the trouble was adjusted, and the company returned to their old method of paying once every two weeks, as required by law.

MONTGOMERY COUNTY.

Vandalia Coal company—Miners struck March 15 against a reduction in wages from 92 to 86 cents per ton for mining. After being out 17 days succeeded in retaining their old price.

SULLIVAN COUNTY.

Milan Land & Coal Mining company—In December miners struck to have one of their number restored to work who had been discharged for sending out unmerchantable coal. The discharged man was restored to work, and the mines resumed operation after being idle one week.

AMENDMENTS TO THE MINING LAW SUGGESTED.

I desire to call attention to a few needed amendments in the mining law, chief among which is the necessity for an additional Inspector. This matter has been suggested in other reports from this Department, and as the bill introduced at the last General Assembly, allowing an assistant, was defeated, and as the mineral industry of the State is increasing each year in magnitude with such rapidity that it is a matter of physical impossibility for one Inspector to do the work required of him, I deem it my duty to call attention to the matter again. By a glance at the comparative statistical table of coal, lead, zinc and iron mines, it will be seen that the number of mines herein reported shows a large increase over the report of 1890. From the present outlook, the number of mines will in a few years be double what they are now. Many miners do not seem to understand why it is that the Inspector does not visit the mines more frequently, and it is hard to explain to some of them that it is a matter of impossibility to do so, owing to the great number of mines in the State and the other duties pertaining to the office. I feel confident, however, that those who take the time to read these pages will be satisfied that the Inspector is giving his whole time to his official work.

In my judgment, the mining law governing the operation of lead and zinc mines should be carefully amended in such a manner as to be practicable. If the mining law as it now stands on the statute books, was strictly enforced it would retard the lead and zinc industry in Southwest Missouri. The operation of these mines is necessarily so different from coal mining that there ought to be some distinction in the law governing each. And there should also be a provision in the

statutes requiring mine operators to make a roadway around the shaft bottom, so employes can pass from one side of the shaft to the other without having to cross the cages. Nearly all the more important mine operators have constructed such roadways, and others have done so at our request, yet there are a few who do not seem to see the necessity of it. Any one who is familiar with mines knows that it is very dangerous for persons to be obliged to cross over or under cages in going from one side of the shaft to the other. A piece of coal or debris may fall from the surface, or a cage may be hoisted at the instant the attempt is made to cross, and result in a serious accident.

And I would further suggest that the mining law be so amended as to prohibit any miner from taking more powder into a mine than was absolutely necessary for one day's work, and that in a close vessel.

If such a law was enacted, it might be the means of preventing serious accidents at some of the mines in the State, which is likely to occur under the present method of permitting twenty-five to forty kegs of powder to be taken in at one time in one car, which is the practice at some of our mines. Powder magazines have been found located in mines, which is also a very dangerous thing and cannot be too severely condemned.

ADAIR COUNTY.

Production, 14,820 tons.

Allen Ford—Mine located near Stahl; operated in fall and winter to supply local trade; coal is brought to surface through a drift, and is about $3\frac{1}{2}$ to 3 feet 10 inches thick.

James Harriott & Bro—Mine located in the vicinity of Stahl, and is operated in fall and winter to supply local demand; coal worked pillar-and-room plan, and is about 3 feet 8 inches thick.

J. B. Novinger—Mine not in operation at date of our visit, March 5, therefore no inspection was made, but it has been in operation most of the past year; coal is consumed in the neighborhood and Kirksville; coal about 3 to $3\frac{1}{2}$ feet thick.

Jacob Ledford—Opened a mine last summer, and has been doing a fair local business; mine located near Stahl; employs 3 to 10.

D. R. Pickens—Mine located near Stahl; is idle and has been during the past year.

Pennsylvania Coal company.—H. C. McCahan, general manager, and John Dawson, mine superintendent.

This company is operating two mines in the county, one at Danforth and the other at Stahl, both of which are connected with the Q.

O. & K. C. R. R., by switches. Coal varies from 36 to 42 inches in thickness; pay for mining $3\frac{1}{2}$ cents per bushel in summer and 4 cents in winter.

These mines were inspected March 4. The one at Stahl was wet and muddy along its roadways, but in better condition than formerly, some of the roadways having been corduroyed and much improved since last inspection. Ventilation was being produced by a small furnace which was not giving good results, owing to small air-courses through which it had to pass. On complaining to the mine superintendent of these deficiencies, he informed me that they would soon abandon the old opening and reopen a new one, which they have since done, according to a letter received from Mr. Dawson; about 20 men were employed.

The Danforth mine is a shaft 50 feet deep. It was inspected March 4, and found to be poorly ventilated. After making a thorough examination of the inside workings, I came to the conclusion that the deficiency in the air-current was caused by the imperfection of the fan, which had recently been erected. On examining it we found that two errors had been made in its construction: first, by placing the vanes, with the curve forward; and second, by leaving an opening under the fan-house to receive the air at the tips of the vanes in place of leaving openings at the sides of fan as should have been done. Upon calling the superintendent's attention to these errors, he assured me that the matter would receive prompt attention, which it did, according to a letter received from him a short time after, in which he states:

I changed the fan the week after you was here, and it made a great improvement; there is more than twice as much air passing through the mine as there was when you was here. * * * I have got the air-courses in very good condition now, and hope to keep them that way.

A system of pipes has been laid along main entry for the purpose of draining the workings and roads. By this method the roadways are kept in much better condition than they were when the water was hauled to the bottom in boxes. Coal is about $3\frac{1}{2}$ feet thick, separated by a thin stratum of fire-clay about three inches in thickness. About 34 men and boys were employed. Since last inspection a new cylinder boiler has been put in and a 10-foot fan erected. The principal part of the coal is consumed by the railroad company.

AUDRAIN COUNTY.

Production, 29,792 tons.

Audrain county has shown a large increase over the preceding year in the production of coal. The report for 1891 shows the output to have been 19,569 tons, while in this report it is given at 29,792 tons,

valued at \$1.68 per ton, or \$50,164.85., an increase over the preceding year of 10,223 tons. In producing this amount of coal an average of nearly 100 men were employed.

Audrain Manufacturing Coal and Mining company—Mine located at Vandalia, connected with the C. & A. R. R. by a switch.

The mine and fire-clay works were leased to C. Dixon last March, since which time they have been operated by him.

Shaft is about 65 feet deep; ventilated by a furnace. At date of inspection (May 17) mine was idle, caused by the recent heavy rains obstructing the work in the fire-clay works, where a large per cent of the coal output is consumed.

The fire-clay underlies the coal, and is from 8 to 12 feet thick; the coal is left over the fire-clay working rooms and forms a splendid roof.

The coal is about 28 to 30 inches thick, overlaid with a good roof, and is worked on the long-wall plan.

Mine well drained; roads in good condition.

Omer Detienne—Mine located in the vicinity of Mt. Carmel; shaft 45 feet deep; horse power; coal about 30 inches thick, and worked on the long-wall plan—the output being consumed in the neighborhood.

Jas. D. Montague—Mine located near Laddonia; shaft 20 feet deep; horse power; coal 2½ feet thick; worked on the long-wall plan; mine is idle at this date (June) and has been since March 1.

Owen Lynch—Mine located in the neighborhood of Laddonia; shaft 36 feet deep; operated in fall and winter for local consumption.

Sherman & Bethel—Mine located at Farber; shaft 104 feet deep; horse power; coal 28 inches thick, and worked on the long-wall plan. This mine was formerly operated by the Vandalia Coal Company, but was purchased by the above-named parties last January. The mine gives employment to about six or seven men.

Vandalia Coal company—Wm. Beavers, president, and D. L. Stacy, mine boss. The company is also operating a mine at Wellsville, Montgomery county. Mine located just west of city limits of Vandalia; steam plant; cages, safety gates and hoisting machinery in fair condition. Ventilation is produced by an 8-foot fan, which was giving fair results on date of inspection (May 17, '92).

The coal seam is about 28 inches thick, overlaid with a good slate roof, and a soft fire-clay mining underlying it, rendering the seam peculiarly well adapted to the long-wall plan, which is being used; mine is well drained and in good condition, most of the coal being consumed by the railroad company.

I was informed by the mine superintendent that an escapement shaft would be sunk in a short time in compliance with the mining law.

Last November the miners struck for an advance of 6 cents per ton for mining. After being out two days, the matter was adjusted by the company giving the advance.

A company composed of 12 miners was organized last spring under the name of the Martinsburg Coal Co., with Henry Whitehead, foreman, and G. H. Bruce, secretary, and have sunk a shaft at Martinsburg, in the southeastern part of the county, striking a 30-inch seam of coal, the latter part of June, 1892, at a depth of 102 feet. As the Wabash railway passes near the mine, the shipping facilities are good.

BARTON COUNTY.

Production, 108,784 tons.

Barton county is one of the large coal producing counties of the State. Her principal mines are located at Minden and Liberal, although coal is being mined in the vicinity of Lamar, Milford, Irwin, Beloit, Verdella, Esron and various other places throughout the county, but only to supply local demand. The Missouri Pacific and Kansas City, Ft. Scot and Memphis railways passing through the coal fields of the county, furnish good shipping facilities for the product.

The out put during the past year has been 108,784 tons, which was sold at an average of \$1.18 per ton; while the preceding report gives the out put at 63,626 tons and the average selling price at \$1.45 per ton, thus showing an increase in the production during the past year over the year 1891 of 45,158 tons.

Following is a partial description of the more important mines of the county, together with a statement as to the condition in which they were found on dates of inspection :

W. S. Bacon—Mine located in the vicinity of Boston postoffice, and is operated for local consumption; coal only about 12 inches thick.

John Betz—Mine located near Liberal; slope; coal about 30 inches thick, and worked on the pillar-and-room plan.

Wilson Clark—Mine located near Lamar; drift; coal about 16 inches thick, and worked on the pillar-and-room plan.

Basil D. Hays—Mine located near Lamar; drift; operated in fall and winter to supply local trade.

S. H. Lanyon—Mine located about one mile southwest of Minden, mine postoffice, and connected with the K. C., Ft. Scott & M. R. R. by a switch.

The mine was formerly owned and operated by C. H. Morgan, but was sold to Mr. Lanyon last spring.

Mine was idle at date of inspection (February 17, 1892), and had been for several days, therefore I only made a partial inspection of it. The road-ways were wet and muddy; machinery, cages, etc., in fair condition. A 10-foot fan has been erected since previous inspection, to take the place of the furnace, but the casing around the fan had not been made tight, hence a large per cent of air passed through these openings, therefore the fan was not giving the results it would have given had it been properly constructed.

Mr. Lanyon writes me that after taking charge of the mine he decided to stop the shot-firers, as the limited demand for the product would not justify him in keeping them. When the miners were informed of this, they notified Mr. Lanyon that they would not work unless he continued the shot-firing method, whereupon the mine was closed down, and has been idle ever since. At the time of our inspection, 30 or 40 men were employed.

J. E. Laws—Mine located near Boston postoffice; shaft 16 feet deep; coal about 12 inches thick, and used for local consumption.

Liberal Coal company—John G. Todd, manager; mines located near Liberal—one connected with the Mo. P. R. R. and the other with K. C., Ft. S. & M. R. by switches; the mine connected with Mo. P. R. R. is very wet and muddy, but the other one is comparatively dry, and neither mine was being properly ventilated. This was caused by a poor system of conducting the air through the working places. Notice was given the manager to have the necessary doors erected, in order to properly direct the air-currents, but as yet no information has been received at this office in regard to it. Doubtless the matter was attended to, otherwise I would have heard from some of the miners. The coal is about 30 inches thick, and worked on the pillar-and-room plan; the product is consumed in Missouri, Kansas and Nebraska. Pay for mining, 60 cents per ton in summer and 75 cents in winter.

M. H. Lucas—Mine located near Pedro; drift; coal about 28 inches thick, and worked in fall and winter for home consumption.

The Wear Coal company—W. E. Wear, president; Archie B. Kirkwood, superintendent, and John Kirkwood, mine boss. Mine located about $\frac{1}{2}$ mile southwest of Minden and connected with the Kansas City, Ft. Scott & Memphis railroad by a switch. Shaft was sunk in 1890,

striking coal at a depth of 43 feet. Mine was inspected February 17, and found to be in good condition. Ventilation is produced by a 10-foot fan, which was removing 12,040 cubic feet per minute, as shown by the measurements, which were taken near the foot of the downcast shaft. The system of conducting the air-current through the mine is by splitting it into four separate and distinct currents, each split ventilating separate groups of men. The only complaint I made in regard to the system was that in some instances rooms had been driven in a long distance from the entry, without any method of forcing the air current through them. On calling the mining boss' attention to the matter, he assured me that he would have canvas doors placed on entries in order to force the air around the faces of such rooms. This mine is noted for its dryness. Not one bit of water is found in the whole workings, while the Lanyon mine, which is located only about $\frac{1}{2}$ mile southwest of it, and is nearly as deep, is noted for the great amount of water it makes. Water used for sprinkling roadways has to be piped from the surface.

The coal is about 34 inches thick, and worked on the pillar-and-room plan.

A great deal of powder is used by the miners, but only $5\frac{1}{2}$ pounds is allowed each miner in the mines at any one time, and this in a closed can. This method should be extended to other mines throughout the State, as I consider the careless method of handling powder which is practiced at some of our mines very dangerous.

Machinery, cages, safety catches, gates, etc., in good condition; mine furnishes employment to about 113 men and boys; coal consumed in Missouri, Kansas and Nebraska.

Western Coal and Mining company—Mine located near Minden; connected with the Mo. Pac. R. R. by a switch. The plant has been idle during the past two years, until last fall it was started up and worked until March, drawing pillars, etc., at which time it was worked out and abandoned. Map showing the underground workings of the mine was filed with this office immediately after the mine was abandoned, as required by law.

BATES COUNTY.

Production, 659,924 tons.

Bates county has heretofore been the leading coal-producing county of the State, but in this report she is forced to take second place on the list, having been exceeded by Macon county. If it had equaled its former production, it would still be in the lead. The direct result of

this decrease is due to the Keith & Perry Coal Company exhausting its mines, and removing its plant to the adjoining county. When it is remembered that the immense business heretofore done by this company in Bates county added so largely to its former production, we are pleased to note that the county shows so well in its output as compared with former years.

The entire county is underlaid with the coal measure formation, and coal is being worked on a large scale at Worland, Amoret, Hume and Rich Hill. At the latter place the coal is from $3\frac{1}{2}$ to 6 feet in thickness, and is found from the surface to a depth of 250 feet. This is due to the undulating character of the prairie surface and the dip of the coal. Where it is found near the surface, it is obtained by stripping, but where stripping is not practicable, slopes or shafts are sunk to the seam.

At Foster, Worland and Amoret a 3-foot seam of coal is worked quite extensively, both by underground mining and stripping. A bed of coal about 30 inches thick occurs in the vicinity of Hume, which is being operated by a number of different parties.

Coal is also being mined at Spruce, and about 6 miles northwest of Rockville, to supply local demand. At the former place it is reported as being 12 inches thick, and at the latter from 4 to 6 feet.

The shipping facilities of the county are comparatively good, having three railroads in its limits—the Mo. Pac. R'y running through the county from north to south, the K. C., Ft. S. & M. R'y passing through from northwest to southeast, and the K. C., N. & Ft. S. railroad extending from Kansas City through the western part of the county as far south as Hume.

There are reports from 52 mines, large and small, represented in the statistical table on this county. These 52 mines produced 659,924 tons of coal during the past year, valued at \$1.06 per ton, or a total valuation of \$699,927.35. In producing this amount of coal, there was an average of 1256 men and boys employed in and about the mines.

Following is a general description of each mine, etc.:

AMORET POSTOFFICE.

Blue Lick Coal Mining company—Geo. W. Bozzell, manager. This property is located on Russell Brayton's land, some three miles southwest of Amoret, and about one mile southwest of railroad switch at the M. C. & C. Co. shaft. This company leased the mine and commenced operations about the first of February last, and at date of inspection (June 8) a large ditch was being dug to drain the mine, no

men being employed at the coal face. A strip-pit is also being operated in connection with the mine. Coal about 3 feet in thickness and worked on the long-wall plan.

Mascott Coal Mining company—Geo. W. Bozzell, superintendent. At the time of our visit to this property it was just being put in operation. A shaft was being sunk and a slope opened. The mine is located about one mile from railroad switch; hence the output is hauled to same in wagons.

Missouri Coal and Construction Company—Mine located about 2 miles south of Amoret and connected with the Kansas City, Nevada and Ft. Smith railway by a switch.

The shaft is about 40 feet deep, and equipped with good machinery for hoisting the coal. In September, 1891, the company closed the mine, and it remained idle until May 4, 1892, at which time it was leased to a party of coal miners who commenced operations under the name of Bates County Co-operative Coal & M. Co., with N. Wallace Supt, and Wm. Grischell mining boss. We made an inspection of the property June 8, 1892, and found the mine in a reasonably good condition, considering the short time the new company had been in charge—they not having sufficient time to get the old air-courses, etc., properly cleaned out.

The coal seam is about 32 inches in thickness, but runs very irregular—often being interrupted by faults, and clay-seams.

We are advised that the mine was again closed on August 1, since which time it has been idle.

Russell & McBride—Have recently informed us that they are now opening up a slope, and report the coal as being over 3 feet in thickness.

Thompson Coal and Feed company—F. H. Thompson, manager, and Christian Lotz, mining boss.

Mine located about 3 miles south of Amoret; slope; at date of inspection they were employed laying track and putting the mine in proper condition for more extensive operation, although but little work has been done thus far except the driving of entries, etc.

The coal is about 3 feet in thickness, and worked on the pillar-and-room plan.

J. A. Vance and J. McNaley write us that they have recently opened a slope near Amoret. They also report the coal as being 3½ feet in thickness.

RICH HILL POSTOFFICE.

Wallace Bruce—This mine is located a short distance south of the Keith & Perry Coal company's mine No. 5. It was opened for the purpose of taking out some coal near the crop left by that company. At date of inspection, they had just commenced to drive in from the strip-pit. The coal is about 4 to 4½ feet in thickness and worked on the pillar-and-room plan—the output being hauled on a tram road to a switch having connections with the K. C., Ft. S. & M. R. R.

Hines Bros—Mine located on P. Spencer's land. The coal is brought to the surface through a slope. A new slope has recently been made on the west side of the property, and a tram road built connecting the mine with a switch on the Missouri Pacific railway. This slope, we were informed, would soon be connected with the workings in the old slope, after which all the coal would be brought through the new slope. The coal is from 4 to 5 feet in thickness and worked on the pillar-and-room plan.

What came near costing two of the miners their lives occurred on the 14th day of July. Chas. Miller and Cal. Bowser were working in the mine on the night-shift, and while they were at work a heavy rain storm came up and partly filled the slope with water but fortunately for them the coal rose from the foot of the slope to the working face, and a drainage had been made from the bottom of slope out through the old strip-works to the surface, through which a large portion of the water was drained, although the water completely shut off communication from the outside world. As soon as it was discovered that they were in the mine, a rescuing party was at once organized and set to work pumping and bailing the water out, and it was about 37 hours from the time they entered the mine until they were rescued. The feelings of these two men during their imprisonment can better be imagined than explained.

S. W. Hopkins—Drift and strip-pit; located at Rich Hill; coal from 5 to 6 feet in thickness. The product is hauled to railroad switch in wagons, and shipped to market over the Mo. Pac. R'y.

Peter Pearson—Strip-pit is located about one and one-half miles east of Rich Hill; coal from 4 to 5 feet in thickness. The mine is operated to supply local demand.

Rich Hill Coal Mining company—Major R. M. McDowell, general manager, and J. T. Reavley, superintendent. Mines are located in the vicinity of Rich Hill, but general office of the company is in St. Louis.

This is one of the largest coal companies in the State; indeed, the output during the past year exceeds that of any company in the State, being nearly one-half million tons. The coal varies from $3\frac{1}{2}$ to 5 feet in thickness, and is worked on the pillar-and-room plan. Pay for mining, $51\frac{1}{2}$ cents per ton for run of mine or unscreened coal, and about 69 cents per ton for clean coal. The Harrison mining machines have been introduced into mine No. 14, and as we understand, are giving general satisfaction.

The coal is consumed in Missouri, Kansas and Nebraska.

Following is a partial description of each mine, together with a statement as to the general condition of each at dates of inspection:

Mine No. 2—Mine located one mile north of Rich Hill. This mine has been in operation about 5 years, and the workings have extended into old No. 4, on the west.

Ventilation is produced by a 10-foot fan, which was removing 14,000 cubic feet of air per minute on first inspection (Nov. 28), measured near the head of main entry, about 3,000 feet from bottom of shaft, and nearly 12,000 cubic feet per minute on second inspection—thus showing that the bratticing, stoppings and air-courses are carefully looked after by the mining boss, George Maylin.

A No. 6 Knowles pump has been put in recently; It is located about 2,200 feet from the hoisting shaft, and the steam from the boilers to run the pump is conveyed through pipes all of this distance, but does its work effectively. Track has been laid into the old workings of No. 4, and they are now drawing the pillars. Both air-shaft and hoisting shaft have recently been re-timbered and are in good condition.

Roof good and roadways in fair condition.

Mine No. 3—This is a slope located about 3 miles northwest of Rich Hill. We made an inspection of the mine December 26, and found it fairly well ventilated and in reasonably good condition. A room had just been broken through into the old works of the Keith & Perry Coal company's mine No. 5, through which large volumes of black-damp were coming, but preparations were being made to send a sufficient current of air through it to carry the foul air away. All the work in the east slope was confined to drawing pillars.

We are advised that the mine will probably be worked out and abandoned during the winter. J. B. Watson is mining boss.

Mine No. 4—Contract mine operated by Thos. Graham. This mine is located about $2\frac{1}{2}$ miles north of Rich Hill. It is ventilated by a 7-foot fan which was giving fair results on date of inspection (Nov. 27.)

The working rooms have been driven into old No. 4 on the south, and are approaching No. 2 workings, which are also on the south.

Roof good, but some of the roadways were wet and muddy, drainage being inadequate.

Mine No. 13—This plant is located about $4\frac{1}{2}$ miles northwest of Rich Hill; shaft 60 feet deep and equipped with good machinery for hoisting the coal, and ventilating the mine. A part of the ventilating shaft is bratticed off and used for an escapement shaft, being equipped with a good stair-way.

This is one of the company's large producers, its output for the past year being over 100,000 tons.

We made an inspection of the mine November 27, and found it fairly well ventilated, except a few rooms in an entry southwest of hoisting shaft worked by Mooney, Johnson and others. This deficiency was caused by a poorly constructed canvas brattice, which was leaking. Mr. W. H. Green, mining boss, was instructed to have the brattice cloth removed and a good substantial dirt and shale stopping erected to take its place.

The coal is from $3\frac{1}{2}$ to 5 feet in thickness, and in places even 6 feet is found. As a general thing the overlying roof is good, although in places a light gray shale, usually called by the miners "soap-stone," occurs which is not good, therefore requires a great deal of timbering to keep it secure.

Roadways in good condition and mine fairly well drained.

Mine No. 14—Mine located about 5 miles northwest of Rich Hill, and is one of the best equipped plants in the State. We made three inspections of the mine during the past year, November 25, February 12 and June 13. The mine is ventilated by a 15 foot fan, and the air-current split into three different parts, each division ventilating separate groups of workmen, viz.: first split, first and second, third and fourth east entries on south side, also main south entry; second split, first east entry on east side of hoisting shaft; third split, main north entry.

We found on last inspection that they were having a great deal of trouble, caused by spontaneous combustion in the old gobs, several rooms being sealed up at that time, in order to extinguish the fire. Another annoyance in this mine is the poor roof which overlies the coal, but since the introduction of mining machines, the latter trouble has been partially overcome, as but little powder is now used to bring down the coal, whereas under the old method of blasting the coal off, the solid props were often knocked out and the roof affected in such a manner as to cause large falls at the working face, thus increasing the

cost of operation. We are informed that in rooms in which bad top occurs, now being worked, it would have been impracticable to have worked under the old system.

The mine throws off considerable fire-damp, but is carefully watched by the officials, a special man being employed to make an inspection of the entire workings every morning before anyone is permitted to enter the mine.

Coal is from $3\frac{1}{2}$ to 5 feet in thickness, and worked on the pillar-and-room plan. The mine is a very dry one, road-ways even dusty if not kept sprinkled. Alex. McKinnon is mining boss.

Mine No. 15—This mine is located about 2 miles south of Rich Hill. It is equipped with good machinery for hoisting the coal and ventilating the mine. The 10-foot ventilating fan has been removed from the top of hoisting-shaft and located at the air-shaft which has been sunk during the past year, and at the time of inspection an over-cast was being put in on the west entry for the purpose of splitting the air-current into two parts on this side of the shaft. The air on the east side was being carried around the mine in one continuous current. The coal is from $3\frac{1}{2}$ to $4\frac{1}{2}$ feet in thickness, overlaid with a good shale roof.

The mine was opened during the winter of 1890, hence has been in operation about eighteen months, and has a capacity of 40 cars of lump coal per day. Notwithstanding the short time that has elapsed since its opening, it has produced more than 87,000 tons of coal during the past year.

Inspection was made November 23, and mine found to be in good condition. Edward Allison is mining boss.

Contract Mine—Operated by F. M. Martin. Located about 250 yards north of No. 2 mine. We made an inspection of the inside workings December 28, and found that a great deal of the work was confined to drawing pillars. The mine has since been worked out and abandoned.

Contract Mine—Operated by Simeon Jay. Mine located about $3\frac{1}{2}$ miles northwest of Rich Hill. Drift; coal about 4 feet in thickness and worked on the pillar-and-room plan. Ventilation is produced by a small furnace.

Contract Mine—Operated by Wise Bros. This mine adjoins No. 2 on the west, and is ventilated by the fan at No. 2 mine.

We made an inspection of the inside workings December 28, and found it in fair condition, except the drainage, which was not good, a large pool of water being observed upon the road through which the

workmen and mules had to pass. There is nothing of greater benefit to operators than good roads in mines; mules can do more with less exertion, say nothing of the comfort they afford the workingmen who have to pass over them in going to and from their work.

J. M. Wise—Mine located about 2½ miles northwest of Rich Hill. We made an inspection of the mine November 25, and found the furnace to be removing about 13,000 cubic feet of air per minute. Measurement was taken near the up-cast shaft, but when we took a measurement in the last cross cut near the head of entry, only 3800 cubic feet was found to be passing per minute, thus showing that nearly three-fourths of all the air that entered the mine was lost before reaching the head of the main entry. On calling mining boss Sidney Haynes and Mr. Wise's attention to the matter, they said that the stoppings, doors, etc., would be put in proper condition at once so as to force the air around the workings as required by law. A new air-shaft has been sunk during the past year and a furnace erected. A steam hoisting engine has also been put in to take the place of the horse power. The coal is from 4 to 5 feet in thickness and worked on the pillar-and-room plan; roof good and roadways in fair condition.

Wm. Sullivan—Strip-pit; located about 1 mile south of Rich Hill. We understand Mr. Sullivan will soon commence operating the mine formerly operated by Woodson & Woodson, which adjoins his strip-work. The coal is of a soft nature, therefore is better adapted as a steam coal. It is about 4 feet in thickness.

Keith & Perry Coal company—Mine No. 5, located about 4½ miles northwest of Rich Hill, was worked out and abandoned about the 1st of November, 1891. But they have opened a new mine south of Rich Hill, in Vernon county, known as No. 8.

ROCKVILLE POSTOFFICE.

John A. Ford—Strip-pit; located about 6 miles northwest of Rockville, and about 8 miles northeast of Papinville. Here the coal is found near the surface, hence worked by an open cut by stripping the overlying clay and shale off and quarrying out the coal. The coal is from 5 to 6 feet in thickness, and has the same general appearance as the seam worked so extensively in the vicinity of Rich Hill.

D. D. Peeler—Has a lease on a portion of the property owned by Kansas & Missouri Land and Coal Co, on which this mine is located. The coal here, like the Ford mine, is obtained by stripping, and is of the same general character.

These mines were formerly known as the Nichols banks; coal from 5 to 6 feet in thickness. As they have no shipping facilities, the output is necessarily confined to local demand; other coal beds are known to exist in this vicinity, some of which have been worked in past years, but as the limited demand would not justify a continuance, they were abandoned.

It seems to us that this is a good coal field for large coal operators or capitalists to investigate.

WORLAND POSTOFFICE.

Kincaid & Co.—This company does a large coal business in the vicinity of Worland.

The coal is about 3 feet in thickness, and is obtained by stripping off the overlying clay and shale, after which it is quarried out and hauled to railroad and shipped to market. A great number of other strip-pits are in operation in this vicinity, all operating the same seam of coal.

Chas. Russell—Slope; located near Ward's switch, on Kincaid's land. The mine was formerly operated by F. A. Ramey; coal 3 feet thick, and worked on the pillar and-room plan.

N. R. Vaughn—Slope; located on Kincaid's land. The coal is about 3 feet in thickness, and worked on the long-wall plan. This mine is generally idle during the summer months, the price of coal in market not justifying operation.

Western Coal and Mining company—Major. R. M. McDowell, general manager, and W. R. Williams, superintendent.

Mines located near Worland and Foster, but general office of company in St. Louis.

Mine No. 1—Located at Ward's switch; was closed down about the 1st of September, 1891, and has not been in operation since; and mine No. 2 has been idle the whole of the past year.

Mine No. 3—Located about $\frac{1}{2}$ of a mile west of Worland, and is connected with the St. L. Emp. Div. of Mo. P. railway by a switch.

The plant is located in a ravine, and the coal brought to the surface through two slopes—one entering the hill to the west of engine-house and the other to the east; ventilation produced by two small furnaces—one located in each mine. While they seemed large enough to do the work required of them, yet in some parts of the mine a deficiency of air was found, caused by poorly constructed stoppings and canvas doors. The attention of the mining boss, John Joplin, was called to the matter, and he was instructed to replace the canvas doors

with wooden ones, and make such other improvements as were necessary to better ventilation.

The coal is about 3 feet thick, and overlaid with a gray shale, which is not good, hence requires a great deal of timbering to keep it secure. The coal is interrupted by faults, and rolls in the roof, which is also a great source of annoyance to both operator and miner.

Pay for mining 81½ cents per ton.

We are informed by the company that the above mine was abandoned about August 1, 1892.

BOONE COUNTY.

Production, 21,053 tons.

Mining is being prosecuted in the vicinity of Brown's Station, Centralia, Columbia, Harrisburg, Perche and other places throughout the county, but only in a limited way to supply local trade—the Columbia Coal Mining Company being the only mine having railroad facilities.

Following is a partial description of each mine.

CENTRALIA POSTOFFICE.

Centralia Coal company—W. H. Carpenter manager. Mine located about 1½ miles east of Centralia. Shaft 30 feet deep; horse power; coal about 24 inches thick and worked on the long-wall plan, the roof overlying it being well adapted for the same.

Mining is done in the fire-clay which underlies the coal. The mine was inspected May 14 and found to be in fair condition. However, it makes considerable water but is reasonably well drained.

The product is used to supply local trade.

G. M. Wiley—Mine located about 3 miles north of Centralia. Horse power; shaft about 30 feet deep. Coal 26 inches thick and worked on the long-wall plan. The mine is operated to supply local trade.

COLUMBIA POSTOFFICE.

B. S. Benefiel—Mine located 3½ miles northeast of Columbia. Slope; coal about 3 feet thick, and worked pillar-and-room plan.

The mine is operated in fall and winter to supply local trade.

Columbia Coal Mining company—A. Rees, superintendent. The plant is located at Switzler postoffice, about 5 miles north of Columbia, and connected with the Columbia branch of the Wabash railway by a switch.

This is the most productive mine in the county, and is the only one having railroad connection. The shaft is 112 feet deep; horse-power; ventilation produced by an iron basket, used as a furnace in the air-shaft. Owing to a fall of slate in the air-course, the ventilating apparatus was not giving good results at date of inspection (May 13). However, a force of men was employed cleaning up the fall.

The coal is about 36 to 38 inches thick, overlaid with a soft shale roof, which requires very careful timbering. The method of mining has been changed from the pillar-and-room to the long-wall plan, which is giving better satisfaction.

Pay for mining, 80 cents per ton. Most of the output is consumed by the railroad company.

W. A. Goodding—Mine located 4 miles north of Columbia. Horse power; shaft 50 feet deep. The coal is 3 to 3½ feet in thickness and overlaid with a good shale roof. Pillar-and-room plan is followed. The product is consumed in Columbia and vicinity.

STURGEON POSTOFFICE.

Wald, Andrews & company—Mine located about 2½ miles south of Sturgeon.

This mine was operated last year by D. A. Mayer & Bro., the present operators taking charge about the first of May, and are now sinking a new shaft on the same tract of land. The coal is about 30 to 36 inches thick, overlaid with a very soft shale roof.

The output is used to supply local market.

CALDWELL COUNTY.

Production, 38,333 tons.

Caldwell county is the tenth county in production of coal, and is now noted as having the deepest shaft in the State. It is located at Hamilton and is 500 feet in depth.

During the past year 38,333 tons of coal were produced and sold for \$56,214.96, or an average of \$1.58 per ton, and for the same period in 1890 and 1891, 22,661 tons were produced, which was sold for \$40,874, or an average of \$1.80 per ton, thus showing an increase of 15,671 in tons, but a decrease of 22 cents per ton in the amount received for the output.

COWGILL POSTOFFICE.

Cowgill Mining company—James Blair, superintendent; mine located about $1\frac{1}{2}$ mile west of Cowgill; connected with C., M. & St. P. R. R. by a switch; shaft 340 feet deep; equipped with steam plant. The shaft was sunk about three years ago, but the tip-house was burned down shortly after the mine was put into operation, and was not rebuilt until August, 1891, since which time it has been in operation, furnishing employment to 8 or 10 men. The coal varies in thickness from 6 to 18 inches, and has the general appearance of that worked at Kingston and Hamilton.

HAMILTON POSTOFFICE.

Caldwell Coal company—Mine located about $1\frac{1}{2}$ mile east of Hamilton, and connected with the Hannibal & St. Joseph R. R. Mine was inspected on the 17th day of December, also March 11. On first inspection, they were opening up the lower seam of coal, which is about 147 feet below the seam formerly worked, and about 507 feet below the surface. The coal is 18 to 20 inches thick, overlaid with a hard shale roof, and underlying the seam is a fire-clay, which renders it suitable to the long-wall plan, which is adopted.

Mr. Wm. Hall, the superintendent, had just erected a 10-foot ventilating fan to take the place of the steam jet, which was in use a few weeks before our visit. This had made a great improvement in the air current. After making this inspection, I notified the officials of the company that it was necessary that an escapement shaft be sunk as required by law, and in due time they informed me that they had commenced work on the shaft in question. The second inspection was made to ascertain how the work was progressing, and we found the shaft down about 65 feet, and being pushed to completion; since this visit, I have been notified that the shaft is down to a depth of 150 feet.

The mine furnished employment to about 80 men and boys; coal consumed in Missouri and Nebraska.

Hamilton Coal company—Joseph McCourt, mine superintendent, and Ralph Booth, secretary. Mine located about $1\frac{1}{2}$ mile southeast of Hamilton; connected with the Hannibal & St. Joseph R. R. by a switch.

Ventilation is produced by a 10-foot fan, which was on date of inspection (December 18) giving fair results.

Machinery, safety-catches, cages, gates and bonnets in good condition.

The coal varies from 1 to 2 feet in thickness and is overlaid with a splendid roof. Considerable water was lying along the west coal face which had to be pumped out, while the roadways along the entries were dry and in good condition. An overcast had been put across the main west entry, through which the air-current is now being conducted, which has made an improvement in the ventilation. From 30 to 60 men are employed; coal consumed in Kansas and Nebraska.

KINGSTON POSTOFFICE.

Kingston Coal Company—E. H. Johnson president, and T. W. Hines sup't. Mine located about one mile north of Kingston, connected with Hamilton and Kingston R. R. by a switch. Shaft is 240 feet deep; equipped with a pair of engines 10x12 inches in cylinder; engine shaft geared to a 5-foot drum 3 to 1; steam is generated by a two-flue boiler. The tip-house and other equipments are fairly well arranged for a plant of this character.

Ventilation is produced by a steam jet, located in the ventilating chamber, which is separated from the main hoisting shaft by wooden brattice-work. On date of inspection (December 18), mine was found in good condition and the mining law being observed, with the single exception of gates around shaft-top; after calling the superintendent's attention to the matter he assured me that it would receive his prompt attention, which it did, according to a letter received from him a few days later.

The coal varies in thickness from 10 to 24 inches and has the appearance of being the same seam worked by the Hamilton Coal Company at Hamilton, and Cowgill Mining Company at Cowgill; pay for mining \$1.25 per ton.

Coal is consumed in Missouri, Kansas and Nebraska. About 30 to 35 men are employed.

CALLAWAY COUNTY.

Production, 16,551 tons.

The principal mines in Callaway county are located in the vicinity of Fulton, and are operated to supply local demand. The Fulton Fire-Brick and Mining Company has recently sunk a shaft near Fulton, and equipped it with good machinery, and are doing a fair business. A. Harris & Bro.'s mine is also connected with the railroad, and has a limited amount of commercial trade. A description of the mines is as follows:

FULTON POSTOFFICE.

Wm. Castle—Located near Fulton; drift; coal about 26 inches thick and is worked on the pillar-and-room plan. An air-shaft has been sunk during the past year; from three to four men are employed.

Fulton Fire-Brick and Mining company—S. Threlkeld president and David Jones mine-boss. Mine located about $1\frac{1}{2}$ miles west of Fulton; connected with South branch of C. & A. R. R. by a switch. The shaft was sunk several years ago by other parties and operated for a short time, after which it was abandoned. Last fall the above named company re-opened the mine and are now operating it. They have erected a good substantial tip-house and put in a hoisting engine; also sunk an escapement shaft. The coal is about 30 to 34 inches thick; worked on the long-wall plan. It is overlaid with a fair shale roof. A seam of fire-clay is also being worked by the company, which underlies the coal seam, and is being hoisted out through the same shaft; it is about 8 feet in thickness, and worked on the pillar-and-room plan.

Since the plant was put in operation, about 10,000 tons of fire-clay and 3600 tons of coal have been mined, all of which have been used in the manufacturing of fire-brick at the company's works in Fulton. About 45 to 50 hands are employed in and about the fire-clay and coal mine. The inside workings of the mine were dry and in good condition on date of inspection (May 18, 1892).

John Harris—Mine located near Fulton; horse-power; shaft 40 feet deep; coal about 30 inches thick, and underlaid with several feet of fire-clay, which is now being worked and shipped to Chicago.

The coal is used to supply home market.

A. Harris & Bro.—Mine located about one mile west of Fulton; connected with South branch of C. & A. railroad by a switch.

Inspection was made May 18, and mine found in reasonably good condition, considering the bad roof which they have to contend with. I did not see any good roof in the mine; even entries and air-courses have to be cross-timbered to secure the roof; if this is not done, it will fall until it arches itself.

On the night before this inspection was made, a fall of roof occurred in the air-course—cutting off ventilation from a portion of the mine—which had to be removed before the miners could proceed to their work.

Most of the output is used by the railroad company.

Jno. Marsenkoff—Mine located near Fulton; shaft 50 feet deep; horse-power; coal about 3 feet thick; worked on the pillar-and-room plan. The product is used to supply home market.

James Smith—Mine located near Fulton; drift; coal is about 32 inches thick, and worked on the long-wall plan. Coal consumed in Fulton.

Tharp & James—Mine located about two miles northwest of Fulton; slope; coal about 28 inches thick, and worked on the long-wall plan.

GUTHRIE POSTOFFICE.

A. W. Oriswell—Mine located near Guthrie; drift; coal is about 28 inches thick and worked on the pillar-and-room plan. The mine is operated by R. M. Henderson; coal is mined to supply home consumption.

M'CREEDIE POSTOFFICE.

J. S. Henderson—Mine operated in fall and winter to supply home trade. The coal is about 34 inches thick and worked on the pillar-and-room plan.

STEPHENS' STORE POSTOFFICE.

W. M. Guy—Mine near Stephens' Store; shaft 50 feet deep; coal about 3 feet thick; worked on the long-wall plan. The product is used to supply home market.

CARROLL COUNTY.

Production, 1380 tons.

Very little mining has thus far been carried on in Carroll county, notwithstanding the entire county is underlaid by the coal measure formation. The principal mines reporting as operated during the past year are located in the vicinity of Carrollton and Norborne. The coal varies from 15 to 22 inches in thickness, and is used to supply local demand.

CHARITON COUNTY.

Production 2312 tons.

While the whole of Chariton county is underlaid by the coal measure formation, yet very little mining is being carried on. The mines that have been operated during the past year are only worked upon a very small scale to supply the local demand. The mine producing the most coal is located near Salisbury and operated by A. G. Swetman.

The coal is reported to be about 22 inches thick. Other small mines are also operated in fall and winter in this vicinity. Near Indian Grove strip-pits are being worked by Joseph Fuller and J. W. Isle—the coal being 18 inches thick.

T. C. Subletts is operating a strip-pit near Mendon to supply local trade, where the coal is reported as being 23 inches thick. A strip-pit is also being worked for home consumption near Newcomer, by G. W. Muckey, who reports the coal as being 18 to 20 inches in thickness. Several other small mines are operated in fall and winter in different parts of the county.

We visited a mine which had just been sunk by C. M. Williams, located about 1½ mile south of Marceline, on the 3d of March. This shaft is 65 feet deep, and coal about 18 inches thick—probably the same seam as that worked by the Kansas & Texas Coal Co. at Marceline.

CLAY COUNTY.

Randolph Coal and Gas company—The mine is located at Randolph, and is a well-equipped plant, but has not been in operation during the past year. Suit was filed against the officials of the company a little over one year ago to compel them to make a second opening, to be used as an escapement shaft, as required by section 7063, R. S. of 1889, whereupon the company closed the mine down, and it has been idle since.

It does seem to us that there is too much capital invested in this plant to allow it to lie idle. The hoisting apparatus, boilers, etc., are first-class.

We understand that they are keeping the mine drained and in good condition, contemplating starting up again in the near future.

COLE COUNTY.

Production, 1548 tons.

ELSTON POSTOFFICE.

Elston Coal Mining company—David Edwards, manager. Mine located near Elston; shaft 40 feet deep; horse power. The coal is found deposited in a small basin, and is said to be several feet in thickness. The mine has just been put in operation; therefore the output was small for the past year.

Geo. H. Leach & company—Mine located about $2\frac{1}{2}$ miles west of Elston and about $\frac{1}{4}$ of a mile south of Missouri Pacific railroad track, on J. A. Elston's land. Shaft 135 feet deep; horse power. The shaft was sunk in the center of the coal deposit, which is said to be 20 or 30 feet thick in places, and extends over a small area, but the extent of the area is unknown to us.

There was no protection around the shaft-top nor safety catches on cage at the time of our inspection. Mr. Wm. T. Tendel, who was in charge, was duly notified to have gates put around shaft-top and safety catches put on cage as required by law. With these exceptions I found the mine in fair condition. Coal used to supply local trade; some, however, is shipped to points along the Missouri Pacific railroad.

COOPER COUNTY.

Production, 3666 tons.

BOONVILLE POSTOFFICE.

Chas. W. Hazell—Strip mine; is located about $1\frac{1}{2}$ mile south of Boonville; coal about 18 inches thick; mine operated to supply local trade.

H. W. Jenkins—The property upon which this mine is located adjoins the city (Boonville) limits on the south. The coal is about 16 to 18 inches thick; worked on the long-wall plan, and is brought to the surface through a drift. Mine idle date of inspection, but has been leased to Kasper Kochner, who will operate it during the coming year.

Missouri Valley Coal and Mining company—A. P. Mills, manager, and J. M. Rich, mine boss; mine located on the side of the hill, just south of the Missouri river, and about 4 miles west of Boonville. The shaft now being operated is about 80 feet deep, equipped with fair machinery, which was in good condition on date of inspection (April 21, 1892). The coal is found in a trough, or basin, and has been worked for a number of years. The deposit is about 100 feet wide, but its length east and west is not known; however, it has been followed for about 500 feet. It is of the cannel variety, and is principally used in the manufacturing of gas. From 6 to 8 men are employed.

A. Palmberg—Is operating a mine near Bunceton to supply local trade.

The shaft is 100 feet deep; horse power. The coal deposit is said to be about 15 feet thick.

DADE COUNTY.

Production, 6881 tons.

SYLVANIA POSTOFFICE.

Robert McCluey—Mines located near Sylvania. The coal is about 28 inches in thickness, underlaid with fire-clay, which affords splendid mining. The output is used to supply home market; from 12 to 15 men are employed in fall and winter.

S. McGarvey—Mine located near Sylvania; slope; coal about 28 to 30 inches thick, and worked on the pillar-and-room plan.

Ramsey & Evans—Are now operating the mine on J. R. Seaton's land, which was formerly operated by John Riley. The coal is brought to the surface through a slope; it is about 30 to 32 inches in thickness.

R. M. Sharp—Is also operating a mine in a small way in the vicinity of Sylvania. From 2 to 8 men are employed.

There are other mines being operated in the vicinity of Sylvania and Cedarville, but only in a small manner, to supply local trade.

GRUNDY COUNTY.

Production, 28,670 tons.

Grundy county is the twelfth coal-producing county of the State; during the past year she has produced 28,670 tons, against 28,983 tons for the preceding year.

TRENTON POSTOFFICE.

Grundy County Coal company—N. Shanklin, superintendent. This company owns and is operating two mines located at Trenton, both of which are connected with the C. & R. I. R. R. by switches. The above named company is operating the only mines in the county. The coal is 18 inches thick and worked on the long-wall plan. It contains but little sulphur, and is said to be superior to the Iowa coals for locomotive use.

The roof is very good, requiring but little or no timbers, either at the working face or along the roadways. From 6 to 15 inches of the overlying shale is taken down with the coal and used in building pack-walls along the working face, thus saving props.

The price paid for mining varies in summer and winter from \$1.25 to \$1.37½ per ton at the new mine, and \$1.06½ to \$1.12½ at the old mine. These two mines together furnish employment to nearly 150 men and boys. Coal is used by the railroad company and to supply local trade.

Mine No. 1—Is a shaft 210 feet deep ; steam plant ; ventilated by a 10-foot fan, which was giving fair results on date of inspection (March 10), although not as much air was passing around the working face as required by law. On making an investigation it was found that some old timbers had fallen down the in-take air-shaft, partially closing it, causing the deficiency. However, the air courses were in much better condition than on previous inspection.

With this exception we found the underground workings in good order.

The hoisting shaft and cages were in poor condition and needed to be repaired. The superintendent's attention was called to these matters, and he was instructed to have the deficiencies attended to immediately, and we have since been notified that more than a month was spent in making the necessary repairs.

Shaft No. 2—Is 168 feet deep. It was sunk last summer (1891) and has been equipped with good hoisting appliances.

The engines were built by the Ottumwa Iron works and are 14×28 inches in cylinder, connected direct to a 7-foot drum. The engine-house boiler-room and tip-house are fairly well arranged for convenience and economy of working. A 10-foot ventilating fan is used to ventilate the mine. It sets in the upcast air-way at the shaft landing, the ventilating chamber being bratticed off from the main shaft by wooden brattice-work. Considerable water was encountered while sinking the shaft. It occurred at a depth of about 65 feet, while passing through a body of sand and gravel.* In order to prevent the water from running down the shaft, a large sump or basin was shot out in the side of the shaft, in which the water is collected and pumped to the surface.

Entries had only been driven in a short distance from the bottom at the time of our inspection (March 10), and but little attention had been given to the matter of ventilation ; but we were informed that the air-current would be split into four parts as soon as practicable.

HENRY COUNTY.

Production, 137,258 tons.

The coal measure formation extends over nearly the whole of Henry county, and the county ranks as one of Missouri's large producers. The principal mining is being done near Deepwater, Brownington, North, Clinton, Lewis Station and Calhoun. However, mining

*Several large pieces of well-preserved wood were found in sinking this shaft, at a depth of 65 feet, while passing through a bed of sand and gravel.

is being carried on in a limited manner, to supply local trade at several other places throughout the county.

The Missouri, Kansas & Texas railway, passing direct through the county from northeast to southwest, K. C., Ft. Scott & M. and Kansas City & Southern railways from north to south, furnish good shipping facilities for the product.

During the past year there have been 137,258 tons of coal produced, which was sold for \$199,735, or an average of \$1.45 per ton. In producing this amount of coal, an average of 490 men and boys were employed in and about the mines during the year.

Following is a partial description of the principal mines in the county, together with a statement as to their condition at dates of inspection:

BROWNINGTON POSTOFFICE.

Blair Diamond Mine—Operated by John Thompson & Co., mine located near Brownington; connected with the Kansas City Southern railway by switch.

In September, 1891, the company sunk a new shaft, located about 600 feet east of the old one, after which they abandoned the old shaft. The new mine is 50 feet deep, equipped with a small hoisting engine. We visited and made inspections of the property January 30, February 9 and March 15. On first inspection, we found that the ventilating fan was doing but little good, owing to a poor system of conducting the air-current through the mine. The attention of Thos. Coe, mining boss, was called to the fact, and he was instructed to make the changes necessary to properly ventilate all parts of the mine in which men were working, as required by law. The second inspection was made to ascertain if any changes were being made to improve the air, but to our astonishment nothing was being done to better its condition. We made an attempt to take a measurement of the air on the north side of shaft, but the air-current was not sufficient to move the air-meter, and only about 1100 cubic feet was passing along the main air-course on the south side, which was supposed to ventilate the entire mine, in which 50 men were employed. After making this inspection, we notified the prosecuting attorney to bring suit against the company immediately. After the superintendent was notified that suit had been filed, he put men to work at once sinking an air-shaft, and at the same time wrote us a letter, of which the following is a copy:

BROWNINGTON, Mo., Feb. 13, 1892.

C. C. WOODSON, esq., Jefferson City Mo.:

DEAR SIR—We have stopped north side of mine No. 1 until air-shaft is down and fan put up.

Trust this will be satisfactory to you, and if you will withdraw the suit, we will pay what cost there is attached now.

JOHN THOMPSON & Co.
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On receipt of the above communication we again visited the mine, and found the air-shaft in question had been sunk, near the hoisting shaft, in a very convenient place, and the ventilating fan removed and placed over it, which had the effect of greatly improving ventilation. After making this inspection we called at the Prosecuting Attorney's office, and had a conference with that gentleman, whereupon, it was agreed that, inasmuch as the above named company had made the necessary improvements, so as to comply with the law, prosecution would be withheld. The coal is about 3 feet thick, overlaid with a shale roof, which is very poor in places, requiring a great deal of extra timbering. Pillar-and-room plan is followed; entries and some of the rooms are wet. From 36 to 70 men and boys are employed, the number of men being governed by the demand.

Pay for mining 85 cents per ton in summer and 95 cents in winter.

Dunlap Coal company—Lee Dunlap, superintendent; mines located about one mile northwest of Brownington. The company does a great deal of strip-work in addition to the underground mining.

At date of inspection (Feb. 9) about 30 men were employed in the shaft, which is about 25 feet deep. It is equipped with a horse hoister. The coal is about 3 feet in thickness, overlaid with a fair shale roof. It is worked on the pillar-and-room plan.

Ventilation produced by a small furnace, which was giving poor results at date of our inspection, on account of the fire in furnace having been neglected by the mining boss. Instructions were given to the superintendent and mine-boss to have the furnace going at all times when the miners were at work.

CALHOUN POSTOFFICE.

Baldwin & Fonda—Joseph Lennartz supt. Mine located about two miles west of Calhoun, and known as the "Gidney shaft." It is connected with the M. K. & T. R. R. by a switch. August 12, 1891, the tip-house, coal-chutes and engine-house took fire and burned down. It is supposed the fire caught from the ventilating furnace, which was located near the shaft-bottom. But in September the company sunk another shaft, about 500 feet east of the old one, which is 7x14 feet in the clear, divided by partitions into cage-ways—the up-cast or ventilating chamber being bratticed off from the main hoisting shaft by wooden brattice-work.

The plant is fairly well arranged for convenience of working, etc. Five railroad chutes, for coaling engines, of 125 bushels capacity each, have been erected.

We visited and made a careful inspection of the mine on January 28, and found it in good condition.

May 17, the company notified us that they had just erected an 8-foot fan, which was working to perfection.

Coal about 30 inches thick; worked on the long-wall plan. Pay for mining, 85 cents per ton. We are informed that an air and escape-ment shaft are now being sunk.

CLINTON POSTOFFICE.

Wm. England—Mine located about $3\frac{1}{2}$ miles southeast of Clinton; coal 3 feet thick; worked on pillar-and-room plan. Coal consumed in the neighborhood.

I. B. Kinney—Mine located about 2 miles southeast of Clinton; slope; coal about 2 feet thick; worked pillar-and-room plan.

R. C. McBeth—This mining property is located about 3 miles south of Clinton.

The mine is now being operated by L. Shorter. It was operated last year by Mr. Bodi, and formerly known as the Pitcher mine. The shaft now being operated is about 33 feet deep; but the coal crops out along the branch below the shaft, where it is obtained by stripping.

The coal is worked on the pillar-and-room plan, and is from 24 to 28 inches in thickness. The product is used in Clinton and vicinity.

B. L. Owen—Mine located about 2 miles southeast of Clinton; shaft was sunk last fall, striking the coal at a depth of 25 feet. The vein is about 2 feet in thickness, and of good quality. Coal consumed in the vicinity of Clinton; nine men employed at date of inspection January 30, 1892.

DEEPWATER POSTOFFICE

Denham Coal company—R. G. Denham manager. Shaft 47 feet deep; horse-power; mine located near Eaton's switch; and about $3\frac{1}{2}$ miles southeast of Deepwater. It was not in operation at date of our visit, hence no inspection was made of the inside workings.

Hagman & Eaton—The mine is located about 3 miles southeast of Deepwater and near Eaton's switch. Shaft 45 feet deep; horse-power. The mine was being operated by John Hurst at date of our inspection (Feb. 8). At that date the ventilation was not good, but an air-course was being driven to a shaft which had just been sunk, which doubtless improved ventilation when it was completed. No complaints have been received from the employes of the mine, hence we presume that the requirements of law in regard to ventilation have been complied

with. Coal about 3 feet thick, overlaid with a soft shale roof, which required a great deal of timbering to keep it secure.

From 10 to 15 men are employed.

H. B. Hobbs—Mine located about 3 miles southeast of Deepwater; drift; coal 3 feet thick; worked on the pillar-and-room plan.

J. W. Hurst—Is operating a mine on Hagman & Eaton land; located about 3 miles southeast of Deepwater.

The mine was partially filled with water at date of inspection (February 8), therefore we could not make an examination of the inside workings. However, the water was being removed from the mine, and we were informed that operations would be resumed in a few days.

The product is consumed at points along the K. C., Ft. S. & M. R. R. The coal is of the same general character as that worked by H. B. Hobbs, Denham Coal Co., Hagman & Eaton, and others.

Kay Coal company—Strip mines; located near Deepwater; coal about 3 feet thick. The product is consumed in Missouri and Kansas. From 8 to 16 men are employed. J. B. Kay is superintendent.

Keith & Perry Coal company—John Perry, general manager, John Paterson sup't, and Robert Barr mine-boss. The plant is located about one mile northeast of Deepwater, and connected with the K. C. Ft. S. & M. R. R. by a switch. The shaft is 60 feet deep, equipped with good machinery for hoisting the coal and draining the mine.

A good substantial tip-house has been rebuilt since the fire in May 1891, which completely destroyed that part of the plant. The 14-foot fan which was erected after the fire was giving fair results, at date of inspection (Feb. 1, 1892), but the ventilation could be much improved, by splitting the air into two or more parts, instead of sending the whole volume around the face in one continuous current. We mention this, not but what the ventilation was reasonably good at the time of our visit, but that the officials might take the matter under advisement. As the mine is worked on the long-wall plan and the air confined to the working face, the current in narrow places along the same is necessarily very strong, rendering it very uncomfortable for the miner. We have frequently heard them complain of the difficulty in keeping their lights burning at the face; besides, when a fall occurs along the face nearly the whole of the mine is more or less affected by the checking of the air, whereas, if the current was split in several parts, only those working on the split where the fall occurs would be subjected to any inconvenience.

The coal is about $2\frac{1}{2}$ feet thick and overlaid with a good slate roof. However, a fault or two had occurred in the roof on the first and

second-west entries which had the effect of causing several falls. From 90 to 110 men and boys are employed. The output is consumed in Missouri and Kansas.

McFadden & company—H. B. McFadden superintendent; slope; located about 3 miles southeast of Deepwater. Mine was opened last December, but has not been in operation the entire time. Coal about 3 feet thick, worked on the pillar-and-roof plan. From 6 to 12 men are employed.

Wm. Rusk—Is operating a mine located about 5 or 6 miles southwest of Deepwater, to supply local demand. Shaft is 70 feet deep; horse-power; coal is said to be about 33 inches in thickness.

HARTWELL POSTOFFICE.

J. V. Swearingner—Is operating what is known as mine No. 2. The plant is located about three-fourths of a mile south of Hartwell, and connected with the K. C., Ft. S. & M. R. R. by a switch. Shaft 36 feet deep; horse-power; coal about 30 to 34 inches in thickness, overlaid with a fair slate roof, which renders it peculiarly well adapted to the long-wall plan, which is used.

A part of the hoisting-shaft is bratticed off and used as an upcast or ventilating chamber, a small furnace being used as a motive power. The mine was well drained and in fair condition on date of inspection (February 19, 1892).

LEWIS STATION POSTOFFICE.

Co-operative Coal company—L. W. Good, president. Mine located at Lewis Station, and connected with the M., K. & T. R. R. by a switch. We visited and made a careful examination of the mine January 28, and found the underground workings in good condition, but they had neglected to put bonnets or protection over the cages, and attach a brake on drums as required by law. The officials of the company were instructed to have these matters attended to at once. A good escape-shaft had been sunk and equipped with ladders, thus furnishing easy ingress and egress for the employes.

Coal is about 28 inches thick, and worked on the long-wall plan. Pay for mining, 85 cents per ton.

D. B. Pigg & Co.—Wm. J. Gill mine-boss. The mine is located about 1½ mile northeast of Lewis Station. Coal is about 30 inches thick; worked on the long-wall plan. Ventilation produced by a small furnace, which was giving fair results at date of inspection. In January last the heavy rains caused an overflow in Tebo creek, which runs by

the mouth of the drift, and deluged the workings with mud and water, causing a delay of several weeks in its operation.

Pay for mining, 85 cents per ton. The product is consumed along the M. K. & T. R. R.

Tebo Coal company—R. Bowen superintendent, Henry Peckenaugh mine-boss.

Steam plant, located about $1\frac{1}{2}$ mile east of Lewis Station, and connected with the M. K. & T. R. R. by a switch.

Mine ventilated by a small furnace which seems to be sufficient for the work required of it. There was no work at date of inspection (Jan. 29, 1892), hence no fire in furnace, therefore no measurement of the air-current was taken.

The coal is about 30 inches thick, overlaid by a good roof which renders it suitable for the long-wall plan, which is being used.

The mine was found in fair condition at the time of our visit, but the cages were old and needed to be replaced with new ones, which has since been done, according to a letter received from the company.

Pay for mining, 85 cents per ton.

NORTH POSTOFFICE.

Woods & North Coal company—Mine located at North and connected with the K. C., Ft. S. & M. R. R. by a switch.

We visited the property January 30 and February 8. On first inspection the mine was idle, having closed down on the 1st of January. The second inspection was made on being informed that the mine had resumed operations, but we found only 8 men employed loading a few cars of sample coal to be shipped to some parties who were contemplating leasing the property.

We have since been informed that the property has been sold to individual stockholders of the company, and that these parties have leased the mine to the Hurst Coal Co., who will operate it in future.

H. T. Noble—Mine has not been in operation during the past year.

S. B. Price—Has opened a mine near Lucas, and reports the coal as being 16 to 18 inches thick, and worked on the long-wall plan. Coal is brought to the surface through a slope; the product is used to supply home consumption.

JACKSON COUNTY.

Kansas City Clay and Coal company—Wm. Vineyard president, and J. A. Galaher manager. The mine is located about $1\frac{1}{2}$ mile east of the city limits of Kansas City, in section 23, township 49, and range 33 west.

The shaft was sunk during the past year to a depth of 490 feet, passing through several seams of coal which vary from an inch or two to 20 inches in thickness. The one having the greatest thickness and now being opened was penetrated at a depth of 400 feet. It seems to have a uniform thickness of 18 to 20 inches, and is overlaid with a good shale roof. But little sulphur was observed in the coal, except a small band which occurs near the roof. The fire-clay which lies immediately under the coal has the appearance of affording a good mining; it is rather hard now to mine, but when the work is fully opened up, the weight will doubtless help the mining.

The shaft is 7x16 feet in the clear, divided into cage-ways by partitions—the up-cast or ventilating shaft being bratticed off from the main shaft by wooden brattice-work—and is about 3½ by 7 feet in the clear.

Ventilation is produced by an 8-foot fan which sets in the up-cast air-way at the shaft landing. The hoisting machinery was being put in place and the tip-house erected on our last inspection (Sept. 7, 1892). The engines are on first motion, and are 20x32 inch cylinders; connected to a 7½-foot drum. A battery of three boilers aggregating about 225 horse-power generates the steam.

Mine has good railroad facilities for shipping the product.

JOHNSON COUNTY.

Production, 10,485 tons.

Mining is being prosecuted in various parts of the county to supply local trade. However, some shipping by rail is done from Montserrat, and most of the product from the Boyd mine near Knob Noster finds a market at the towns along the Mo. P. R. R. During the past year there have been 10,485 tons of coal produced, against 10,530 tons for the preceding year. Following is a partial description of the principal mines in the county.

Thos. H. Boyd & Sons—Mine located about 1 mile southwest of Knob Noster. The shaft is 69 feet deep, equipped with steam-power; mine is connected with the Mo. P. R. R. by switch and tram-road. Inspections were made April 23 and May 6. On first inspection it was found that no safety-catches were on the cages nor gates around shaft-top, as required by law. Mr. Boyd's attention was called to this fact, and he was instructed to have the safety-catches and gates in question put on immediately. Second inspection was made to ascertain if our

request and the law was being observed, and found the gates and safety-catches in place, but the company had neglected to put cover (bonnet) on cages, which the law also requires. Mr. Boyd promised to attend to this matter at once.

The coal is about $3\frac{1}{2}$ feet thick, worked on the pillar-and-room plan. Roadways were wet and muddy.

We have been notified since our last visit to the mine that it has been closed down.

D. A. Bullock—Mine located about five miles south of Montserrat; coal about 28 inches thick and worked on the pillar-and-room plan. Most of the product is consumed in Warrensburg.

P. D. Fitch—Mine located $4\frac{1}{2}$ or 5 miles south of Montserrat; drift; coal about 28 inches thick and worked on the pillar-and-room plan.

M. B. Meily—Has opened two drift mines on Colbern's land about 1 mile west of Warrensburg. The coal is about 18 inches thick and worked on the pillar-and-room plan. From 10 to 18 men are employed; coal consumed in Warrensburg and vicinity. The mines operated by Mr. Meily last year have been abandoned.

Joseph Murley—Mine was idle at date of inspection, and had been for several weeks. It is located south of Montserrat about 5 miles.

John Park—Operated a small mine in the vicinity of Dunksburg during a part of the past year, for local consumption. Coal about $2\frac{1}{2}$ feet in thickness; worked on the pillar-and-room plan.

E. H. Queener—Mine located about 1 mile northeast of Warrensburg, on John Henry's land. The coal is about 18 inches thick, and worked on the pillar-and-room plan. Mine worked to supply local trade.

M. R. Staley—Mine located about 2 miles northeast of Warrensburg. Coal is worked through a drift, and is about 16 inches thick; worked on the pillar-and-room plan. From 2 to 10 men employed, owing to the demand for the coal.

David Schaffer & Bro.—Are opening a mine about 4 miles west of Warrensburg.

Mr. Schaffer writes us that three seams of coal were encountered in sinking the shaft. The third seam, and the one they propose operating, is 18 to 20 inches thick, and of good quality, according to the report of Mr. Schaffer. The thickness of the other two seams is not given.

B. T. Wood—Mine located $1\frac{1}{2}$ miles east of Warrensburg, and south of Mo. Pac. railroad track. The coal is about 24 inches thick, and worked on the pillar-and-room plan. The product is consumed in Warrensburg and vicinity. From 3 to 10 men are employed.

Mining is also being carried on by a number of local operators at different places throughout the county to supply local demand, but time would not permit us making a personal inspection of each mine.

Having obtained the names of such operators, request was made for a report of their operations, which has been complied with in most cases. These reports may be found in the statistical table under the head of Johnson county.

LAFAYETTE COUNTY.

Product 347,600 tons.

Lafayette is one of the large coal-producing counties of the State; only two, Bates and Macon counties, exceed her in production. The Missouri Pacific and Chicago & Alton railways, passing through her coal fields, furnish good shipping facilities for the product. Although the principal coal mined within her borders is small as compared with some of the coal seams in other parts of the State, yet the nature of the coal, roof and mining are such that it can be economically mined, and its close proximity to Kansas City gives the mine operator the advantage over the operators in some of the other counties in the short haul, and thus enables her coal companies to compete with others in the market. Eighteen inches is about the general average thickness of the coal seams, except the vein opened at Waverly about one year ago. It is from 36 to 44 inches in thickness, but the coal is probably not so good as the thinner seams of the county. The principal mines are located in the vicinity of Higginsville, Corder, Mayview, Lexington, Napoleon, Wilmington, Dover and Waverly; coal is also mined at other places throughout the county, but only to supply local demand.

During the past year there were 51 mines in operation, which produced 347,600 tons of coal, valued at \$1.53 per ton or a total valuation of \$536,092.95. In producing this amount of coal, 1585 men and boys were employed in and about the mines in winter, and 862 in summer.

Following is a partial description of each mine, together with their location and the condition in which they were found at dates of inspection.

AULLVILLE POSTOFFICE.

E. P. Crumpley—Is operating a mine on the Graham estate, located near Aullville. The mine was formerly operated by the Aullville Coal Company.

The coal is about 18 inches thick and worked on the long-wall plan, the product being used to supply local trade.

CONCORDIA POSTOFFICE.

Mining is being carried on in a small way in the vicinity of Concordia. Here the coal is from 18 to 22 inches in thickness and overlaid with a good roof, which renders it suitable for the long-wall plan of working, which is followed. H. Stimmon, Bows Bank and A. F. Kresse are the principal producers. All the output is used to supply local trade.

CORDER POSTOFFICE.

Corder Coal & Coke company—Capt. H. G. Smith, superintendent, and Chas. Benton, mining boss. The mine adjoins Corder on the west and is connected with the C. & A. R. R. by a switch.

This mine is one of the large coal-producers of the county; the shaft is 100 feet deep and equipped with fair machinery for hoisting the product and ventilating the mine.

We made an inspection of the property April 18, and found the mining law being observed and complied with as far as practicable.

Water collects along the west face of coal and road-way leading to the same, which has to be removed, but take the mine as a whole, and we consider it reasonably dry, some of the road-ways being even dusty.

The coal is about 18 inches thick, and overlaid with a good limestone roof. However, several inches of black shale lie immediately above the coal, which is taken down by the miner to give height, and utilized in the building of walls to support the roof along the working face and road-ways.

Pay for mining, 87½ cents in summer, and \$1 per ton in winter.

The mine was closed down about the 1st of May, and has been idle ever since.

Mr. Smith informs us that the company has recently sunk a new shaft at Corder, striking the coal at a depth of 70 feet. He also states that it is their intention to make the new plant first-class in every respect.

J. H. DeBolt, Wm. H. Bell and Fred. Leffman are also operating mines in the vicinity of Corder, but only to supply local trade. The coal is reported to be about 18 to 20 inches in thickness.

DOVER POSTOFFICE.

Dover Coal company—T. Davis of Lexington superintendent, and George Pierce, mining boss.

This mine is located on the river bluff, and probably 75 feet above the Mo. P. R. R. track. The coal is let down the hill on an incline, the loaded car bringing the empty up. Great trouble and expense has been incurred during the past winter, caused by the hill sliding, but it is thought that the trouble from this cause will not occur again, as piling has been driven along the foot of the hill which will probably prevent further slipping.

The coal is from 16 to 24 inches in thickness and worked on the long-wall plan. We made an inspection of the mine April 7, and found the roadways leading to the working face wet and muddy in many places, but little water was observed along the coal face. Roof fair in most places, except in a few rooms on the extreme eastern face here it was not good, due probably to being so near the out-crop. The ventilating furnace was giving good results.

Thos. Spruill—Mine located about 2 miles east of Dover Station.

The mine is operated by Casner & Dayle. Drift; located in the hill, probably 100 feet above the river. Most of the output is consumed by steamboats.

N. F. Fox—Is also operating a mine in the vicinity of Dover to supply local trade.

HIGGINSVILLE POSTOFFICE.

Bonanza Coal company—S. W. Brandaw, manager. Mine located about 1½ mile east of Higginsville, and connected with the C. & A. R'y by a switch.

The shaft is 75 feet deep; horse-power; coal 18 to 20 inches thick, and worked on the long-wall plan.

Bruce & Knoble—Mine located about 1½ mile southwest of Higginsville, and connected with the C. & A. R. R. by a switch. J. D. Bruce, manager and Frank George, mining boss. We made an examination of the mine April 15, and found it in good condition.

From 30 to 40 men and boys are employed.

Excelsior Coal & Coke company—J. H. Campbell, manager, and George Floyd, mining boss. This plant adjoins Higginsville on the

west, and is connected with the C. & A. railroad by a switch. The shaft is 70 feet deep and operated by steam power. Ventilation is produced by a 10-foot fan, which was giving good results on date of inspection, but we were informed by some of the miners that occasionally the fan was not started in morning in time to remove the foul air out of all parts of the mine before they went to work. We notified the officials of the complaint, and they stated that the trouble had doubtless occurred by a trap-door being left open, thereby allowing the air to return to the fan without passing around the working face, and they further informed us that the matter complained of would receive prompt attention.

Coal from 16 to 18 inches thick and worked on the long-wall plan.

Pay for mining, from $87\frac{1}{2}$ cents in summer to $\$1.12\frac{1}{2}$ per ton in winter.

Farmer Coal and Mining company—J. H. Campbell, manager, and Thos. Thomas, mining boss. This property was purchased by Messrs. Campbell, Beatty and others in August, 1891. It is located about 1 mile southwest of Higginsville, and connected with both the Mo. P. and C. & A. railways—connection having been recently made with the Mo. P. R. R. Hence, the shipping facilities are good.

There are three shafts located upon this property, but only one was in operation date of inspection (April 14). It furnishes employment to from 25 to 40 men and boys.

The coal is about 18 inches in thickness, and worked on the long-wall plan.

Mr. Campbell has recently informed us that they have sunk a new shaft near the coal face. This was done in order to dispense with the long under-ground push from the coal face to the bottom of shaft.

Gunn Coal company—Mine located a short distance down the switch below the Farmer Coal Company's mine, and adjoins the Hagood Coal Company. In fact, at date of inspection, the coal was being brought to the surface through the Hagood mine, on account of water being on the roadway.

This is the same seam of coal as that worked in other mines in this vicinity.

We are now informed that the mine is being operated by the Hagood Coal Company.

Hagood Coal company—J. E. Gunn, manager. Mine located about $1\frac{1}{2}$ mile southwest of Higginsville, and is connected with a branch road leading to the C. & A. and Mo. P. railways.

Mine was very wet and muddy at date of inspection, caused by recent heavy rains. We were told that in dry weather there is but little water found in the mine.

The workings had recently been connected with the Gunn mine.

Coal about 17 inches thick and worked on the long-wall plan.

Fredrick Meinerhagan—Mine located about 2 miles southwest of Higginsville. This property was formerly known as the Jackson & Taggart mine, but was purchased by Mr. Meinerhagan in January, 1892. The mine has only been in operation a short time during the past year.

Rocky Branch Coal company—M. L. Belt, manager. The mines are located about $1\frac{1}{4}$ mile southwest of Higginsville, and have switch connections with both the C. & A. and Mo. P. railways—switch connecting the mines with Mo. P. road having recently been put in.

At date of inspection, only a few men were employed at No. 1, opening a drift to be used as an air-course. These mines are usually idle during the summer, but in operation during fall and winter. The coal is about 18 inches thick, and worked on the long-wall plan. Product consumed in Missouri, Kansas and Nebraska.

Stealey & Fowler Coal company—G. W. Stealey, manager. The company is operating two mines, both of which have railroad connections. They are located about $1\frac{1}{4}$ and $1\frac{3}{4}$ mile respectively southwest of Higginsville.

No. 1—Is the most productive mine. It was inspected April 14th, and at that date considerable water was lying along some of the roads, principally caused by the spring rains. A steam boiler had recently been erected with which to furnish steam for pumping.

The ventilating furnace was not large enough to do the work required of it, and we so informed the mining boss, Charles Wright, who stated that they were going to increase its size.

No. 2—Is a shaft about 20 feet deep; horse-power. This mine is also ventilated by a small furnace. The coal is about 18 inches in thickness and worked on the long-wall plan in both mines.

Pay for mining, from $87\frac{1}{2}$ cents in summer to $\$1.12\frac{1}{2}$ per ton in winter.

Wm. Craigg—Is also operating a small mine on the property, in which 6 to 8 men were employed.

Geo. W. Tate—Mine located at Higginsville. Shaft 45 feet deep; horse-power; operated in fall and winter to supply local demand.

J. E. Wilks—Is now operating the Hawkins & Smith mine.

The plant is located about three-fourths of a mile west of Higginsville. Shaft 80 feet deep; horse-power. Coal about 18 inches thick, and worked on the long-wall plan. A switch was being graded at time of inspection connecting the mine with the C. & A. R. R., but we are advised that no connection has been made.

Winsor Coal company—Mine located about 2 miles west of Higginsville, and connected with the C. & A. R. R. by a switch.

March 2, the miners struck for non-payment of wages, and the mine was closed down, remaining idle until May 5, at which time it was sold under a deed of trust, and bought in by some Higginsville parties, who have commenced operations under the name of Y. S. A. Coal Co., W. J. Ballew as manager.

The shaft is about 45 feet deep, and equipped with fair machinery for hoisting, etc.

Coal 17 to 18 inches thick and worked on the long-wall plan.

LEXINGTON POSTOFFICE.

Bell & Greer—Are operating two mines located a short distance southwest of city limits. The two mines together employ 16 to 18 men during fall and winter, but only 5 or 6 in summer. Coal 18 to 22 inches in thickness and worked on the long-wall plan. The product used to supply local demand.

Thos. Clark—Mine was leased to Thos. Kelley last April, and we are informed that he is now blasting down the roof, preparatory to putting in mules. The mine is operated to supply local trade.

Kelley Coal company—T. G. Kelley, manager. Mines located at Lexington. The company has recently leased the Clark mine and are now operating it. Their slope which was being worked last year was abandoned last June, on account of not being able to keep the mine properly drained.

Joseph Keist—Drift; located at Lexington; coal about 20 inches in thickness, and worked on the long-wall plan.

Lafayette Coal company—W. F. Kerdolff, manager; mine located about 4½ miles east of Lexington, and connected with the Boonville branch of the Mo. P. railway by a switch.

Ventilation was being greatly neglected by the company at date of inspection (April 7). At that date, the only method of ventilating the mine was by a small air-shaft in which a small fire was located, called a "furnace" by the mining boss, John Doran. This so-called furnace was located about 38 yards from the main entry. An air-course, which in places was not more than 2½ feet wide and 3 feet high, leading to the

same, afforded the only means of conveying coal to the furnace. The fire was doubtless many times neglected, as a result of the inconvenience of getting coal to it.

After making this inspection, we notified the superintendent of the condition of ventilation, whereupon he informed us that he was contemplating sinking a new air-shaft, which we are glad to state has been done; and we are informed by the miners that the air is now good.

Roadways wet and muddy, but no water was observed along the working face; mine worked on the long-wall plan.

Lexington Coal Mining company—Major R. M. McDowell, general manager, and M. W. Serat, superintendent. Mines located in the vicinity of Lexington, with general office in St. Louis. All the mines are connected with the Missouri Pacific railroad by switches.

The coal is from 18 to 24 inches in thickness, reaching probably the greatest thickness in the McDowell shaft, where it is sometimes found 26 inches thick.

All the mines are worked on the long-wall plan, the overlying roof being well adapted for the same. Pay for mining \$1 per ton in summer and \$1.12½ in winter, in mines where the miners push the coal to the weigh office or bottom of the shaft, but where the company employs mules to haul the coal from the miners, 87½ cents is paid per ton in summer and \$1 in winter.

The product is consumed in Missouri, Kansas and Nebraska.

We give below a brief description of each mine, together with a statement of the condition of each at date of inspection:

Graddy Mine—Located about 2½ miles west of Lexington; drift opening. At date of inspection, April 1, only a few men were in the mine. The plant usually furnishes employment to about 45 to 55 men and boys. Ventilation is produced by a furnace. Roof and roadways are in good condition.

We are informed by the superintendent that an electric plant is now being erected, for the purpose of mining coal by machinery, electricity being used as the motive power.

Hackett Mine—This plant is located about 1½ mile west of Lexington, and probably 1 mile east of Graddy mine. It is also a drift; ventilated by a 10-foot fan, which was giving good results at date of inspection, April 4.

Roadway is in good condition, except near the mouth of drift, where some water and mud were observed, caused by the recent wet weather. The mine was idle July, August and half of September, but has been in operation the balance of the year, furnishing employment to from 50 to 65 men. James Rosswell is mining boss.

McDowell Shaft—The mine is located just east of city limits of Lexington, and is a steam plant, equipped with fair machinery. A 10-foot fan produces ventilation, and was on date of inspection giving good results.

Roof and roadways are in good condition, and mine well drained, with the exception of a short distance, near the bottom of shaft, where some mud and water were found standing on the road, due, probably, to the recent heavy rains.

Riverton Mines Nos. 1 and 2—Peter Nord, mining boss; mines located probably $1\frac{1}{2}$ mile east of Lexington, and are also connected with the Mo. P. railway by switches. Both mines are being ventilated by a furnace located near the mouth of No. 1. The mines were idle at date of inspection (April 2), hence no accurate measurement of the air could be taken, as there was no fire in furnace. We are of the opinion, however, that the ventilation is not good at all times, owing to the location and construction of the furnace, and the long distance the air has to travel. We have had no complaints, however, from any of the employes of these mines.

The roof on roadways was being blown down preparatory to employment of mules to bring the coal from the miners, working face. Heretofore the miners have been required to deliver their coal to the weigh office, for which they were paid extra per ton for mining.

Roadways in fair condition; mine well drained, except near the mouth of No. 1, where some mud and water were encountered. These two mines together, furnish employment to 140 to 150 men and boys.

Henry Macey—Mine located about $2\frac{1}{2}$ miles west of Lexington, and connected with the Mo. P. railway by a switch. We made an inspection of the mine April 1, and found the ventilating furnace not producing the amount of air required by law. This fact was reported to both Joseph Perry, mining boss, and Mr. Macey, and they were notified to make necessary improvements in order to improve ventilation. Mr. Macy soon after notified us that a new air-shaft would be sunk in a more convenient location and a new furnace erected as soon as practicable; and we have since been informed that the shaft in question has been completed and the ventilation much improved.

Mine was fairly well drained at date of inspection, except along the face of coal between the first and second east entries, where a small pool of water collected, which had to be bailed out.

This mine furnishes employment to about 55 men and boys.

J. C. McGrew—Mines Nos. 1 and 2 are located about $3\frac{1}{2}$ miles west of Lexington, and connected with the Mo. P. R. R. by a switch.

We visited and made inspections of these mines April 4 and June 17. The mines were idle on date of first inspection, but we made a careful inspection of the inside workings and ventilating furnace, and were of the opinion that the furnace, owing to its location, could not furnish at all times the amount of air required by law, and we so informed Mr. McGrew. On May 30 we received a letter from one of the miners, stating that the ventilation was bad and had been for some time, and urged that something be done to compel the mine owner to comply with the law. On receipt of this letter we immediately wrote Mr. McGrew, notifying him of the complaint that was made, and urged him to make such improvement as was necessary in order to increase the air-current, and at the same time we notified the miner what we had done, and asked him to give Mr. McGrew a few days to make such improvements before answering our letter; and in a short time thereafter we received another letter signed by two of the miners, which is as follows:

LEXINGTON, Mo., June 11, 1892.

Mr. C. C. Woodson, Mine Inspector, Jefferson City, Mo.:

Sir—As I wrote you some time ago in regard to J. C. McGrew's coal mine, the air is so bad a man can not get to the face some days, and that is about three or four days out of a week, so the men have talked the matter over and want you to come and do something for their good. There has not been anything done since you was up here early last spring.

Respectfully,

(Signed)

As no communication had been received from Mr. McGrew, in answer to our letter, we immediately visited the mines on receipt of the above and made a careful examination of them, and found between 56 and 62 men and boys employed, and only about 2900 cubic feet of air passing; measurement was taken within 30 feet of furnace, and only 1120 cubic feet per minute passing along the face near the head of main road. In passing around the face, we were informed by several of the miners that they had to go out several times on account of bad air, and often went home, they stated, with headache caused by impure air.

After making this inspection, we called at Mr. McGrew's office and laid the whole matter before him, but he gave us no satisfactory answer. On the following day we called to see him again, in company with the prosecuting attorney, whereupon the gentlemen agreed to erect a fan at our suggestion, to take the place of the inadequate furnace, which he has since done, putting in a 10-foot fan, which we are informed by the miners is furnishing an abundance of air.

The mine was found in good condition on each inspection, with the exception of the inadequate ventilation complained of, and we are glad to state, this must be in good condition now.

The coal is about 18 inches thick, and worked on the long-wall plan. The product is consumed in Missouri, Kansas and Nebraska.

Morris Bros.—Drift; located between the Seawell and Hackett mines. Coal is about 18 inches thick and worked on the long-wall plan. The output is consumed in the vicinity of Lexington.

Andrew O'Maley—Shaft 25 feet deep; horse-power; mine located about $\frac{1}{2}$ of a mile southwest of Lexington. This is the same seam of coal operated so extensively in this vicinity. It is about 20 inches thick and worked on the long-wall plan.

Thos. Walton—Mine located at Lexington; coal about 18 inches thick, and is worked on the long-wall plan. The output is used to supply local demand. From 8 to 10 men are employed.

S. Riely—Has recently sunk a shaft about $1\frac{1}{2}$ mile south of Lexington, striking the coal at a depth of 60 feet; coal reported to be 20 inches thick; mine is being operated to supply local trade.

MAYVIEW POSTOFFICE.

Mayview Coal company—P. C. Wilson, superintendent, and R. J. Adams, mining boss.

This plant is located about $\frac{1}{2}$ of a mile east of Mayview, and connected with the C. & A. railway by a switch.

The mine is the property of Mr. Strasburg, but was leased to the above-named company last November, since which time a hoisting engine has been put in to take the place of the horse-power. Cages have been overhauled, and safety catches, bonnets and gates readjusted; all of which were in fair condition at date of inspection (April 18), and the general condition of the plant much improved.

Ventilation produced by a small furnace, located near the hoisting shaft a part of which is bratticed off and used as a ventilating chamber.

The coal is about 16 to 18 inches thick and worked on the long-wall plan.

Mine operated last year by L. A. Gasaway.

NAPOLEON POSTOFFICE.

Missouri River Coal Mining company—J. B. Silver, president and manager. The mine is located near the Napoleon station, and is connected with the Mo. P. railway by a switch.

Since our last inspection, one year ago, a hoisting engine has been erected to take the place of the horse-power which was then being

used. We also observed that the water which was leaking through the roof at a few places along the face, on previous inspection, had disappeared, doubtless due to the fact that the working face has been driven back under the bluff, where the overlying stratum is more compact, affording less chance for the water to pass through. The roof on roadways leading from the bottom of shaft to coal face has been blown down, and the roadways much improved.

Ventilation is being produced by a small furnace, which was giving fair results at date of inspection (April 5).

The mine furnishes employment to from 15 to 50 men and boys—the number employed being regulated according to the demand for the product.

This is the same seam of coal as that operated so extensively at Lexington and Higginsville. It is about 18 to 20 inches thick, and worked on the long-wall plan.

Napoleon Coal and Mining company—J. H. Duffendack, superintendent, W. W. Witty, mining boss. This mine is located about 1 mile east of Napoleon Station, and connected with the Mo. Pac. railway by a switch.

We made an inspection of the property April 5, and found that the company had neglected to put gates around the top of shaft as required by law, but a piece of timber was placed around the top of the shaft, intended as a precaution; but as a car may be pushed under this timber and into the shaft while men are ascending or descending in the cages, it affords no protection against an accident that may occur in this manner; and as the company had paid no attention to our repeated requests that gates be placed around the shaft, we therefore notified the prosecuting attorney to bring suit against them for violating the mining laws. (The case has not yet come to trial.)

The roof along main roadway had been blasted down in order to give greater height, and the general condition of the inside workings was much improved.

Mine makes considerable water, but is fairly well drained; coal about 18 inches thick and worked on the long-wall plan.

WATERLOO POSTOFFICE.

Chas. H. Hartman—S. W. Paddock, mining boss. Mine located about $\frac{1}{4}$ of a mile east of Waterloo, and connected with the Mo. P. R. R. by a switch.

The mine was formerly known as the Hartman & Gilbert Coal Mining Company, but in August, 1891, Mr. Hartman bought Mr. Gil-

bert's interest, so the mine is now operated under the name of the former party.

Ventilation produced by a small furnace which was giving fair results at date of inspection (April 3).

Mine fairly well drained and in reasonably good condition.

Coal about 18 inches thick and worked on the long-wall plan.

WELLINGTON POSTOFFICE.

Andrew Carter—A small drift mine, located near Wellington; coal is about 18 inches thick and worked on the long-wall plan.

The output is used to supply local demand.

J. M. Seawell & Co.—Mine located about $1\frac{1}{2}$ mile west of Wellington and connected with the Mo. P. R. R. by a switch.

We made an inspection of the mine April 5, and found the ventilating furnace giving fair results, and the general condition of the inside workings good.

This shaft-top, like the Napoleon Coal and Mining Company's mine, did not have gates around it, and as we had time and again notified the superintendent to have the matter attended to, we notified the prosecuting attorney to bring suit against the company for violating the law, but the case has not yet been tried.

The coal is the same seam as that worked at Napoleon and Lexington, and is about 18 inches thick, overlaid with a good roof, which requires but little timbering, either at the face or along the roadways.

Wellington Coal company—M. V. L. McClelland, manager, and Scott Griffin, mining boss. Mine located at Wellington, and connected with the Mo. P. railway by a switch.

We made an inspection of the mine April 5, and found that the escapement shaft had been made in compliance with our request and the law.

The shaft is about 35 feet deep to the coal, and the seam dipped to the working face; hence, water collects at face, and has to be pumped out. The mine is ventilated by a small furnace, which was giving good results on date of inspection. Coal 18 inches thick, and worked on the long-wall plan.

WAVERLY POSTOFFICE.

Francisco Coal company—A. C. Francisco, proprietor. Mine located about one mile west of Waverly station. The shaft was sunk last fall, striking the coal at a depth of 110 feet. Mine is connected with Mo. P. by a switch. This is a steam plant, fairly well constructed. A part of the hoisting shaft was bratticed off and is used for a ventilating

chamber, a furnace being used as the motive power at this date (April 6). We also observed that the mine was throwing off considerable fire-damp, and so informed Mr. Francisco. and instructed him to get a safety lamp at once and have the inside workings carefully examined every morning before the miners be permitted to enter the mine. May 20 we again visited the mine and found that they had neglected to get the safety lamp in question, but we were informed that it had been ordered. We were called to the mine July 12, 1892, on account of an accident in which Andrew Francisco lost his life by an explosion of fire-damp. From the evidence it seems that on the second of July the mine was partly flooded with water, and on the 12th inst. Mr. Francisco and Henry I. Chrisman went down the shaft with open lights to take a measurement of a steam-pipe, preparatory to putting in a pump, and their open lights ignited the fire damp, causing a dreadful explosion, killing Mr. Francisco and injuring Mr. Chrisman. There being about 2½ or 3 feet of water in the shaft at the time is probably what saved Mr. Chrisman's life, as he stated under oath that the concussion from the explosion knocked him down and he staid under the water a few seconds, permitting the fire to pass over him, and was therefore only slightly injured when hoisted out a few minutes later. But Mr. Francisco's body was not recovered until 8 o'clock the following day. It was found about 12 or 15 feet from the shaft bottom.

Owing to the mine being partially filled with water no inspection could be made of the underground workings at that time, so we again visited the shaft on the 30th inst., and made a careful examination of the inside workings, and found that the explosion had traveled over all the main south and east entry, doing considerable damage by blowing out timbers, stoppings etc. August 28, the company had just completed the erection of a 10-foot fan, when the tip-house, together with the fan, was burned down (it is thought that some one set fire to the plant). The fire also burned the curbing out of the shaft for 20 feet below the surface, and on the 3d day of September, while the men were retimbering the shaft, Mr. H. C. Anderson, who was acting mining boss, while Joseph Whiteman (mine-boss) was absent, struck a match to light his pipe and threw the burning piece of match down the shaft, which ignited the fire-damp, causing an explosion which blew the scaffold out from under them. Mr. Anderson and H. Asher fell to the bottom of shaft, a distance of about 90 feet, receiving injuries from which they died on the following night. J. F. Delaney, who was helping them in the shaft, caught to the buntons and was hoisted out, and while he was badly burned, will doubtless recover.

After investigating this accident we gave instructions to the superintendent to permit no one around the shaft except those employed in the reconstruction of the plant, and to see that none of the employees go about the shaft with an open light, or matches upon their person, until such time as the shaft is thoroughly ventilated.

As these accidents occurred since the 30th of June, at which time our fiscal year ends, they are not included in this report, but we have merely mentioned them to inform the public how they occurred, and what precautions have been used to guard against such accidents. These accidents will be discussed more thoroughly in the report of 1893.

The coal is about $3\frac{1}{2}$ feet thick, overlaid with a fair shale roof. The pillar-and-room method of mining is followed.

Waverly Coal & Mining company—F. E. Downs, manager. Mine located about 300 yards east of Waverly Station, and connected with the Mo. Pac. R'y by a switch.

This shaft was sunk last fall, striking the coal at a depth of 100 feet. When the mine was first put in operation, a horse hoister was used, but it has been removed and a small hoisting engine erected. The coal is about $3\frac{1}{2}$ feet in thickness, separated by a band of shale 2 inches thick. Overlying the coal is a shale roof several feet in thickness.

The mine is operated on the pillar-and-room plan—powder being used in getting the coal. Pay for mining, $81\frac{1}{4}$ cents per ton for clean coal, and $68\frac{1}{4}$ cents per ton for run of mine or unscreened coal.

The opening of this and the Francisco Coal Co.'s mine has developed a new coal field heretofore unknown in this county. While the coal may not be as well liked for domestic purposes as the Lexington and Higginsville seam, yet it is claimed to be a good steam coal, and as it can be produced at a small cost, will doubtless be largely used for that purpose.

LINN COUNTY.

Production, 35,588 tons.

The coal production of Linn county has shown a fair increase during the past year as compared with the preceding year. The report for that year showed the output to have been 28,036 tons, while the report for this year gives the product at 35,588 tons, an increase of 7552 tons.

BROOKFIELD POSTOFFICE.

George Clark—Mine is located about $1\frac{1}{2}$ mile east of Brookfield. Shaft 140 feet deep; equipped with a horse-hoister. The coal is about 24 inches thick, overlaid with a soft shale roof, which requires careful timbering to keep it secure. Owing to the great amount of rain which fell last fall and winter, leaving the country roads in such bad condition, the output has fallen far short of what was expected, not only at this mine, but at other local mines in the county.

J. W. Morris—Mine located about $1\frac{1}{2}$ mile east of Brookfield, and near the track of the H. & St. Joe railroad. The mine was operated last year by H. W. House. Shaft 140 feet deep; horse-power. The coal is used to supply local trade.

Bernard Schaefer—Mine located about $2\frac{1}{2}$ miles southeast of Brookfield; horse-power; shaft 150 feet deep. The same seam of coal as that in the Clark and Morris mines is being worked. It is about 24 inches thick here, and worked on the long-wall plan. The mine is only operated during the fall and winter to supply local trade.

MARCELINE POSTOFFICE.

Kansas & Texas Coal company—Joseph Hemmings, mine superintendent, and Peter McCall, mining boss. Mine located about $\frac{1}{2}$ mile southeast of Marceline depot. This company owns and is operating a number of other mines in this and other western States, with general office in St. Louis.

This shaft is known as No. 32, and is connected with the Santa Fe railway by a switch. Machinery for hoisting in good condition.

We made a careful examination of the mine March 2, and found the law being observed in every respect.

The air is split into four different currents, each part ventilating separate groups of workmen, and a good stairway in the escapement shaft. The mine throws off a small per cent of fire-damp, but it is carefully looked after by the officials—a special man being employed to make an inspection of each working place every morning before any of the miners are permitted to go to work.

Coal is about 26 inches thick, and worked on the long-wall plan, the roof being well adapted for the same.

The output is consumed in Missouri, Iowa, Kansas and Nebraska.

R. F. Landrith & Son—Mine located about $\frac{1}{4}$ of a mile northeast of Marceline; horse-power; the shaft is 126 feet deep, and was sunk last summer. We made an inspection of the mine on the 10th day of

March, at that time 8 men being employed. The coal is from 26 to 30 inches thick, but contains considerable sulphur. Mine is operated to supply local trade.

LIVINGSTON COUNTY,

Production, 1000 tons.

Very little mining has been done in this county during the past year, although coal is reported as having been worked in past years at several different places, but only to supply local trade. The W. A. Cox mine is the only one visited by me. It is located about 5 or 6 miles north of Chillicothe. Shaft 60 feet deep; horse power; coal is from 18 to 20 inches thick and worked on the pillar-and-room plan. The coal is overlaid with several feet of shale, which forms a good roof.

Several other mines in this vicinity have been worked in past years that are now abandoned.

MACON COUNTY.

Production, 685,335 tons.

Macon county has produced more coal during the past year than any other county in the State. Her output has increased very rapidly during the past few years, until now she stands at the head of the list. Our report for the year ending June 30, 1889, shows the output to have been 225,679 tons, while this report for the past year gives the output at 685,335 tons, showing an increase in the production during this time of 459,656 tons, or a gain of 203 per cent. In producing this 685,335 tons of coal, an average of 1599 men and boys were employed in and about the mines.

The principal mines are located in the vicinity of Bevier and Lingo on the Hannibal & St. Joe railway, and at Ardmore on the Wabash railroad. However, a number of small mines are located in the vicinity of Macon City and other places throughout the county, which are operated in fall and winter to supply local demand.

Following is a partial description of each mine, together with a statement as to the condition they were found in on dates of inspection:

ARDMORE POSTOFFICE.

Kansas & Texas Coal company—B. F. Hobart, president, E. J. Crandall, general manager, and W. E. Merlin, mine superintendent at this point.

This company owns and is operating a number of mines in this and other states, with general office at St. Louis.

Ardmore is a small mining village, located about 4 miles west of Excello, consisting of about 200 dwelling-houses, one-half of which, we are told, are owned by the employees. Two churches, one school-house and a public hall have been erected. The company owns a large supply store, where all merchandise generally used by miners is kept.

These mines are connected with the Wabash railway by a switch, extending from the main line at Excello.

A large tract of coal land is owned by this company in this county, upon which six large mines are located, besides a number of small ones, operated by contractors. Two of the mines are located near Bevier, and will, therefore, be reported under that postoffice.

A great many very valuable improvements have been made at the mines during the past year, chief among which are the erection of a number of new dwelling-houses at some of the mines, erection of a new hoisting engine at No. 33, Ardmore, and the building of side-tracks, etc., at other mines.

The seam varies from $3\frac{1}{2}$ to 5 feet in thickness and is overlaid with a shale roof (although in some places the sand rock is found immediately above the coal! What the miners call a "bell" rock often occurs in the roof, which is very dangerous and requires to be carefully timbered. Rocks of this character have been the cause of several serious and some fatal accidents during the past year.

All the company's mines in this county are worked on the double-entry pillar-and-room plan. Pay for mining unscreened (run of mine) coal, 50 cents per ton in summer and 60 cents in winter.

The coal is consumed in Missouri, Iowa, Kansas and Nebraska.

Following is a description of each plant, together with a statement as to the condition in which they were found at dates of inspection:

Mine No. 26—Was idle at date of our inspection, having closed down about the first of December, hence no inspection was made of the inside workings. The mine is still idle. Little 26 was also idle at dates of inspection.

Mine No. 27—Ben Thomas, mining boss. No. 27 comprises four different openings; old 27, proper, was worked out and abandoned more than a year ago. These other openings were made in hills adjoining the old mine, and coal brought to the same tipple on tram-ways, hence the number is not changed. But the openings are locally known by some name, which we will here use in order to distinguish one from the other.

Second addition is a drift driven into a small ridge, at back of addition proper. It is ventilated by a small furnace which was giving fair results at date of inspection, removing about 4600 cubic feet of air per minute.

No. 27 addition comprises two drifts—one entering the hill to the right and the other to the left. There were no men working in the latter opening except a few drawing pillars, and nearly all the men at work in the former opening were also employed drawing pillars and finishing rooms.

About 600 feet to the right of the tip-house, two drifts enter the hill, which are known as twin openings, or 27 first addition. They are ventilated by a furnace, which was giving fair results at dates of inspection.

Most of the work in this mine is confined to drawing pillars; for this reason we do not deem it necessary to give further details as to its operation.

Mine 33—Slope; steam-power. This mine was inspected December 7 and July 13. On first inspection we found that the ventilating fan was removing about 11,000 cubic feet of air per minute, which was being conducted around the mine reasonably well. However, we found break-throughs partly filled with waste dirt before others were made—which greatly blocked the current—and in other places we recommended that canvas doors be put up on roadways to force the air to the faces of rooms that had been driven in long distances ahead of the air-current.

We also notified Mr. Jones, who was then mining superintendent, to make a safe roadway for the miners to pass to and from their work, as we did not think the one then in use safe, as the employes had to pass up and down the slope on the track, there being no place of refuge along the same.

On our second visit, we found the slope timbers had been removed and the slope widened to 12 feet and retimbered, thus affording a good traveling road along one side of the track. A new hoisting engine had also been put in, and the revolving screens which were in use last year had been taken out and a long shaking screen erected. Some improvement had been made in the method of conducting the air-current through the mine; but there was room for still further improvement, especially in keeping open the break-throughs between entries already referred to. Air measurement was 13,860 cubic feet per minute.

Roadways were wet and muddy in places, while other traveling roads which had been in bad condition have been corduroyed and made comparatively dry. J. P. Sneed is mining boss.

Contract Mine No. 27 $\frac{1}{2}$ —Operated by James Duncan. Drift, located about 400 or 500 yards east of No. 27 tip-house.

The mine was inspected July 14, and found to be very wet and muddy, especially along its roadways. Most of this was caused by the recent heavy rains, the water from which passed through the shallow roof into the mine; we also found the mine improperly ventilated. The first east was the only entry which was being even fairly well ventilated, this result being due to the fact that an air-shaft had just been sunk near the head of same.

I notified Mr. Duncan of the deficiency in air, and also called the mine superintendent's attention to it, at the same time giving instruction that the ventilation current be increased to meet the requirement of law. Fifteen men are employed.

Contract Mine—Operated by D. E. Davis. Is located a few hundred yards farther east from Duncan's mine. Here the coal is also brought to the surface through a drift. The coal having been exhausted in the ridge near the tippie, the works have been extended to the adjacent ridge, at which point operations are now confined.

Mine ventilated by a small furnace, which was giving fair results at date of inspection. R. Corbin is mining boss.

Contract Mine—Operated by S. A. Moss. Located one-half mile northwest of No. 26. Drift; opened in 1890, but has been idle most of the time since it was opened.

Mine fairly well ventilated, and in good condition at date of inspection (July 14).

Contract Mine—Operated by George Ferries. Located about $\frac{1}{4}$ of a mile northwest of the old one which he worked out and abandoned one year ago.

The mine has only been in operation a part of the year, on account of not sufficient market for output; and at date of inspection (July 14), only about 14 or 15 men were employed.

Furnace is used in producing ventilation; mine well drained and in good condition. James Miller is mining boss.

Contract Mine—Operated by J. G. Brock. Mine located on the branch road about half way between Excello and Ardmore.

It is also a drift, ventilated by a small furnace, which seems to be large enough to furnish sufficient air for the number of men employed. No measurement of the air was taken, however, on account of but little fire being in furnace and the mine not being in operation at date of inspection.

Roadways good, mine well drained and in fair condition. D. W. King is the mining boss.

The company is sinking a shaft two or three hundred yards northwest of No. 33 which promises to be one of the large producers when put in operation. Judging from the plan upon which the plant is to be constructed, it will be a well-equipped mine.

BEVIER POSTOFFICE.

Kansas & Texas Coal company—This company is operating the following named mines, located at Bevier, with Wm. Egly mining superintendent.

Mine No. 43—Is located about 1 and $1\frac{1}{2}$ miles southwest of Bevier. The mine is connected with the H. & St. Joe railway by a switch.

Ventilation is produced by a 10 foot fan which was giving fair results at date of inspection (December 11), but in some parts of the mine we found that the air was not being properly conducted to the workmen. For instance, the boss was making a practice of turning rooms on entries inside of the last break-through, and of course ahead of the air-current. We called the superintendent's attention to this fact, and notified him to discontinue the practice.

The plant is well equipped with good machinery for hoisting, etc. Mine is a large one, furnishing employment to 150 to 180 men and boys. Drainage good.

Mine No. 46—Is also connected with the H. & St. Joe railway by a switch. It is located about $1\frac{1}{2}$ mile southeast of Bevier. The shaft was sunk last fall and struck the coal at a depth of 168 feet, and the company has since erected one of the most complete and elaborate plants in the State. The engines were built at Litchfield, Ills., and are 18x36 inches in cylinders, connected to a 6-foot drum; 4 large boilers are used in generating the steam. The tip-house is 97 feet long, 34 feet wide and 35 feet above the surface. From the ground to top of sheave-wheels is 60 feet.

A shaking or jolting screen has been put in, which is likely to revolutionize the method of screening and preparing coal for market in this State, as it absolutely takes every particle of fine slack and dust out of it. Other smaller screens having the same shaking motion, are under the large one, in order to separate the coal into the different grades. The screen is so arranged that the holes in the perforated steel plates can be closed in a few seconds' time by a lever. This is done when run of mine coal is to be loaded.

An air compressor having a capacity to run 15 Harrison mining machines, several of which are in use, has been put in. An air and escapement shaft has also been sunk, and a 12-foot fan erected.

The entries were just being driven away from the bottom at date of inspection, hence no permanent system of ventilation had been adopted, but the superintendent informed us that soon as practicable the air would be split into four separate currents. We are not yet advised whether this has been done.

Mine No. 42—On our visit to the mine we were informed that the miners were all employed drawing pillars, and that the shaft would soon be abandoned. Hence no inspection was made of the underground workings.

The mine was abandoned April 15, and the miners put to work in the company's other shafts.

Bevier Black Diamond Coal company—W. S. Watson, manager, and L. Bradford, mine superintendent. Mine located about $1\frac{1}{2}$ mile southwest of Bevier, and connected with the Hannibal & St. Joe R. R. by a switch.

This mine is practically a new one, having been opened during the past two years. Shaft is 60 feet deep; plant equipped with good hoisting machinery.

We made a careful examination of the mine December 10, also May 11, and found the underground workings in good condition, and fairly well ventilated. On our first inspection, the two east entries were the only ones in the mine in which there seemed to be a deficiency in air, and this was caused by the entries having been driven too far ahead of the air-current. Break-throughs from one entry to the one following it should be made at intervals of not more than 60 feet, and the break-through behind securely filled with debris, so as to keep the air-current near the working face.

At dates of inspection, a furnace was being used to produce ventilation, but as it was located in the shaft, which was calculated to be used as an escapement shaft for the employes, we notified the officials to either sink a new shaft to be used as an escape, or erect a fan at the one in which the furnace was located and remove the furnace; whereupon Mr. Watson stated that they would act on the latter suggestion, and erect a fan. They have since notified us that a 12-foot fan has been put in.

The coal is about $4\frac{1}{2}$ feet in thickness, and interrupted with but few faults or slips. The double-entry pillar-and-room method of mining is followed. Pay for mining, 60 cents in winter, and 50 cents in summer for run of mine (unscreened coal).

Loomis Coal company—W. H. Loomis, president and general manager, and Thos. Francis, sup't. of mines.

This company is a large producer of coal; their mines are located at Bevier, and have connection with the Hannibal & St. Joe R. R. The coal in these mines varies from $3\frac{1}{2}$ to 5 feet in thickness and is overlaid with a shale roof, which is reasonably good as a general rule. However, in places it is very rotten, and requires therefore to be carefully timbered. The double-entry pillar-and-room method of mining is followed at all these mines. Pay for mining, 60 cents in winter and 50 cents per ton in summer for run of mine (unscreened coal).

The output is consumed in Missouri, Kansas and Nebraska.

Following is a partial description of each plant, together with a statement as to the condition each was found in on dates of inspection:

Mine No. 1—Steam plant; shaft 60 feet deep. It is located just back of H. & S. Joe R. R. depot. There are several railroad chutes for coaling engines, adjoining the plant. Ventilation is produced by a 10-foot fan, which was removing about 15,000 cubic feet of air per minute on our first inspection (measurement taken near the shaft bottom), but owing to several narrow places in air-courses and leaks in doors, stoppings, etc., a large per cent of the air was lost before reaching the workmen. This was demonstrated by measurements, which we afterward took on entries several hundred feet from shaft bottom. After making an investigation of the air-courses, we notified the president, Mr. Loomis, to have them cleaned out so as to permit the passage of the amount of air required by law.

The roadway leading from this mine to No. 4 was in fair condition, on date of inspection.

Water from swollen creek broke into mine No. 2 about the 1st of April, and in a few days it commenced leaking through the old workings into this mine, and about the 1st of May it was running in so fast that the employes had to be withdrawn.

Mr. Loomis writes us that it was June 24 before the water was pumped out and work resumed.

Mine No. 3—Is also a steam plant and is located about three-fourths of a mile west of Bevier. We made a careful examination of this mine on the 14th day of December. At that time there were about 40 miners and 18 other persons employed.

Ventilation was being produced by a 10-foot fan which was giving results, and roadway leading to the escapement shaft was also in good order. The mine was closed down early in the spring, due probably to the fact that the demand for the product had fallen off.

April 3, water from a creek which runs by the shaft broke into the workings of mine No. 2, owned by the Oakdale Coal Company, and located about one-fourth of a mile east of this one, and as the underground workings of the two mines are connected, the water soon flooded both mines.

We have recently received a letter from Mr. Loomis stating that the mine is still idle, the water not having been pumped out.

Mine No. 4—This is by far the largest producer of any of the mines owned by the company. It is equipped with reasonably good machinery for hoisting the coal, ventilating and draining the mine. The plant is also equipped with machinery with which to mine the coal, the Harrison mining machine being used. Air is furnished by two Norwalk air-compressors.

The underground workings are probably the most extensive of any mine in the county, some of the entries having been driven nearly three-fourths of a mile from the bottom of hoisting shaft.

We made a careful examination of the mine December 14, and found a fair current of air passing along most of the entries, but was not being properly distributed through the workings. The 15th and 16th east entries on north side of shaft were being poorly ventilated, this defect being partially due to the imperfect canvas door, hung between the two entries, leaking the air. We instructed the mining boss, Ed. Opie, to have a good wooden door hung to take its place, and to make other necessary improvements, so as to better ventilate those parts of the mine which were not receiving their proportion of the air; and as no complaints have been received from the miners in regard to the matter, we have no reasons to doubt but that our instructions have received prompt attention.

The mine is connected with No. 1, also with Watson Coal Company's mine on the east, hence has two escapement shafts.

Most of the roadways on the north side were in good condition, but some of them on the south side were very wet and muddy and needed to be corduroyed.

Oakdale Coal company—J. W. Atwill, president. Mine is located at Bevier, and connected with the Hannibal & St. Joe railway by a switch.

We made a careful examination of the mine Dec. 11, and found it better ventilated than on any previous inspection, but the roadways were being somewhat neglected by the officials.

In November the company leased 40 acres of coal land lying near the shaft-bottom from Mr. Jones, and was at date of inspection open-

ing it up, this doubtless being the principal cause of the ventilation being so much improved, as the air had several hundred feet less distance to travel.

On the 3d day of April, water broke into the mine from a creek which runs near the shaft, and flooded the workings, and the mine has been idle since.

Watson Coal company—W. S. Watson, manager, and Wm. Rivers, mining boss. The plant is located at Bevier, and connected with the Hannibal & St. Joe railroad by a switch.

We made two inspection of the underground workings and hoisting appliances during the past year. The first was made on December 10, at which date the fan was removing 10,400 cubic feet of air per minute. Measurement was taken on the main entry several hundred feet from the shaft bottom, and this air was being forced and circulated around the mine reasonably well, except, however, in a few rooms in fifth east entry on the north side of shaft. We called the mining boss' attention to the fact, and advised him to place a canvas door on entry to force the air-current around through these rooms, which he assured me would be done. With this exception, the mine was found in good condition.

The second inspection was made March 1, more especially to ascertain whether the escapement roadway through to mine No. 4 was in proper condition for egress and ingress of employes, and found that the roof had fallen and partly blocked the passage in places. The mine-boss, who was with us, put men to work at once, cleaning up the falls. We also found that the rope on the east cage was in bad condition, and therefore notified Mr. Watson to see that no one be permitted to go up or down on the cage until a new rope was put on, and we have since been notified that our instructions were strictly complied with.

The coal is from 3½ to 5 feet in thickness and worked on the double-entry pillar-and-room plan.

LINGO POSTOFFICE.

Little Pittsburg Coal company—A. G. French, manager. Mine located at Lingo and connected with the Hannibal & St. Joe railway by a switch.

Two inspections have been made of this mine during the past year.

The first inspection was made on December 16, and we found that the air was being split into two currents, at the head of main north, entry, one part passing around the face to the left, and the other around the workings to the right, and returning through the air-course and

over the entry, through an over-cast to the main return air-course thence to the up-cast shaft.

The splitting of the air into two currents had good effect, but the fan was only removing about 5750 cubic feet per minute, or about 66 cubic feet per man per minute. We therefore notified the company of the deficiency in air, and at the same time suggested that they erect a larger fan to take the place of the one in use, which is only 6 feet in diameter. I am glad to state that a 12-foot fan has since been put in.

The second inspection was brought about by a petition received from the miners stating that the escapement shaft was not in safe condition. On making an investigation, we found that several of the ladders were unsafe. Hence instructions were given to the mining superintendent in charge to have these decaying ladders removed at once, and replaced with new ones, and men were put to work to carry out the recommendation. A few days prior to this inspection a cog-wheel was broken on the hoisting engine, leaving the employes down the shaft for several hours until another one could be put on, is what led to the escape-shaft investigation.

The mine is a very dry one, even dusty, except around shaft-bottom, where a small quantity of water collects and has to be pumped out. Coal is worked on the long-wall plan.

The product is consumed in Missouri, Kansas and Nebraska.

MACON POSTOFFICE.

Macon Coal company—W. G. Walker, sup't, and Wm. Massey, mine-boss.

The plant is located about $1\frac{1}{2}$ mile west of Macon and connected with the Hannibal & St. Joe railroad by a switch.

We made an inspection of the mine on the 9th of December and found a deficiency in air, caused by many small places in air-course through which it had to pass. The superintendent was notified to have the air-courses in question cleaned out, and to see that the amount of air be forced and circulated around the workings, as required by law. On our next visit to that part of the State we were informed that the mine was idle, having closed down April 1; hence no further inspections have been made.

A number of local mines are in operation in the vicinity of Macon City to supply local demand. Among the principal small operators are: George W. Batchelder, W. J. Blanset, John Harold, Thos P. Hunt, Charles Lawrence, Peter F. Rowland, George E. Smith, L. Zollman, Robert Terrell, and others. Some of these mines have only produced a few tons of coal during the past year, but are included in our report.

as each ton reported helps to swell the grand total, and gives the public some idea of the mineral wealth of Missouri.

Mining is also being carried on in a small way near College Mound by J. G. Richmond and J. R. Pipp's & Son.

MONTGOMERY COUNTY.

Production, 16,039 tons.

Henry Whitehead—This mine is located about one mile south of Wellsville, shaft 40 feet deep; horse-power; mine operated in fall and winter to supply local trade. The coal is about 24 inches thick and worked on pillar-and-room plan.

Vandalia Coal company—W. J. Hughes superintendent. The mine is located about three-fourths of a mile west of depot, and connected with the Wabash railway by a switch.

The shaft is well equipped with an engine of sufficient capacity for a plant of this character. An 8-foot ventilating fan was erected last September, to take the place of the furnace, and it was giving good results at date of inspection. Coal is about 30 inches thick, and worked on the long-wall plan, the roof being suitable for the same.

Slips and faults are frequently encountered, which adds to the cost of operation. Roadways good and mine well drained. Ten railroad chutes have been erected for the purpose of furnishing coal to railroad engines.

NODAWAY COUNTY.

Production, 1850 tons.

Coal mining in this county is confined to a number of small banks in the vicinity of Quitman and along the Nodaway river in the western part of the county. A partial description of the principal mines is as follows:

W. J. Carden—Owns two mines, located about 1 mile south of Quitman—one a slope and the other a shaft about 20 feet deep; coal in each about 15 inches thick. They are worked in a very small way, to supply local demand.

E. Dixon—Mine located in the bluff on the west bank of Nodaway river, a few miles south of Burlington Junction.

The coal is reported as being from 10 to 15 inches in thickness, and worked on the long-wall plan. The output is used to supply local demand.

Jos. M. Nicholas—Mine located about 2½ miles southeast of Quitman. Shaft 32 feet deep; horse-power. Coal about 1 foot in thickness, and worked on the pillar-and-room plan. Only 2 or 3 men are employed.

N. Roberts—Mine located near Quitman; shaft 40 feet deep, operated in fall and winter to supply local demand. The coal is reported as being about 18 inches thick and worked on the pillar-and-room plan. Mr. Roberts has recently notified us that he is now out of the coal business, hence the mine is idle.

There are a number of other small local operators in the vicinity of Quitman, who mine a small amount of coal each year to supply local demand.

PUTNAM COUNTY.

Production, 134,984 tons.

Putnam county ranks among the large coal producing counties of the State. She comes seventh in order of production. Her principal mines are located in the vicinity of Mendota and on Blackbird creek near Unionville. During the past year the output was 134,984 tons, which was sold for \$172,483, or an average of \$1.27 per ton, while the report for the preceding year shows the output to have been 123,526 tons, which was sold at an average of \$1.16 per ton, or \$143,554, an increase of 11,458 tons. In producing this amount of coal there was an average of 327 persons employed in and about the mine, during the year.

A partial description of each mine is as follows:

BLACKBIRD POSTOFFICE.

William Adkins—Mine located near Blackbird. Shaft 27 feet deep; horse-power. Coal about 32 inches thick, and worked on the pillar-and-room plan.

The product is used to supply local demand.

Blackbird Coal company—C. W. Lane, president, and Wm. Love, superintendent. Mine located at Blackbird, connected with C. B. & K. C. R. R. by a switch. Steam-power; shaft 53 feet deep.

Since last inspection, the company has made considerable improvement in and about the mine by the erection of the hoisting engine to take the place of the horse-power, and the sinking of an escapement shaft; also by the erection of 18 dwelling-houses and a store building.

The coal is about 33 inches in thickness, separated by a clay parting about 2 inches thick. The roof overlying the seam is good, requiring no extra amount of timbering.

Prior to the date of our inspection, they were depending on natural ventilation, but at that time they commenced the erection of a furnace, which was completed a few days later.

MENDOTA POSTOFFICE.

Mendota Coal & Mining company—F. B. Ketcham, president, B. H. Johnston, superintendent. This company owns a large tract of coal land lying in the vicinity of Mendota, upon which these mines are located. The coal is about 32 to 34 inches in thickness, overlaid with a good roof, which renders it well adapted for either the long-wall or pillar-and-room plan, both of which are being used, but the pillar-and-room method is preferred. It crops out in the hill-side and is worked by a drift and slope—the slope being made in order to elevate the tip-house above the railroad track.

This is by far the largest coal company in the State north of Macon county. It furnishes employment to from 250 to 280 men and boys.

Mining machines run by compressed air are being used in mine No. 1. The men who operate them are paid by the lineal foot for mining the coal. For instance, a machine runner receives 50 and the shoveler 35 cents per lineal foot for under-cutting a room which is 40 feet wide, and for driving entries 8 feet wide, they are paid 20 and 14 cents per lineal foot respectively. A force of men follows each machine, wedging or shooting the coal down and loading it into cars, after which the room is timbered and made ready for the machine again.

Pay for hand-mining, 70 cents in summer and 88 cents per ton in winter.

The product is consumed in Missouri, Iowa, Kansas and Nebraska.

Mine No. 1—E. C. Smith, mining boss; drift opening. The coal is brought to the surface by machinery, what is known as the tail-rope system being used.

We made a careful examination of the mine on the 7th day of March, and found about 18,190 cubic feet of air passing through the workings, which was produced by the two furnaces. The one on the north side was giving decidedly the best results—the only objection we could have to the ventilation on this (north) side being the long distance it had to travel before reaching the workmen. Mr. Johnston, superintendent, has since notified us that certain entries have been abandoned, and a “header” driven from one entry to another, through which the air is carried, thus shortening its travel 2500 feet, which, he adds, has much improved ventilation. The south side was not receiving its proportion of the air at date of inspection, and we so informed the superintendent, who assured us that they would sink an air-shaft

near the working face, and make other necessary improvement to better the ventilation; and in due time he notified us that the air-shaft in question was completed and an addition of 14 feet had been put on air-stack.

He further stated that the sinking of the air-shaft (which is used as an in-take) lessened the distance the air had to travel about 6600 feet. From our personal knowledge of the mine, we feel assured that these improvements have largely increased ventilation.

Roadways good; mine well drained.

Mine No. 4—This mine is located about three-fourths of a mile north of depot at Mendota. Is a slope; steam-power.

A great improvement was made in the ventilation of the mine by the sinking of the new air-shaft last year. This is the best ventilating shaft in the State. It is a circular shaft, 7 feet 8 inches in diameter, and 78 feet in depth, built with brick from bottom to top. The furnace, which is located near the bottom of shaft, is also well constructed.

Mine well drained and in good condition at date of inspection. J. J. Ward is mining boss.

RANDOLPH COUNTY.

Production, 297,011 tons.

Randolph county is the fourth coal-producing county of the State, being exceeded only by Bates, Macon and Lafayette counties. Her principal mines are located in the vicinity of Higbee, Moberly, Huntsville and Renick, although coal is mined in a number of other parts of the county to supply local demand.

A company under the name of the Caffery Baker Coal Co. has recently been organized with a capital stock of \$100,000, and has, we are informed, commenced opening mines in the vicinity of Huntsville, which will doubtless add to the production of the county during the coming year.

The Missouri, Kansas & Texas, Chicago & Alton and the Wabash railways, passing through the county, furnish good shipping facilities for the product.

During the past year 297,011 tons of coal were produced, valued at \$1.27 per ton, or \$379,232.08. In producing this amount of coal 758 persons were employed in and about the mines in winter and 613 in summer. Following is a partial description of each mine, together with location of same:

the erection of stair-way in same, the splitting of the

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air-current into four currents, the erection of a new boiler and the building of a number of miners' houses.

The mine is one of the most complete and best equipped plants in the State, having a capacity of about 700 tons per day, and furnishing employment to about 275 to 280 men and boys.

The accompanying drawing shows the method of working and ventilating the mine.

We have been informed that the mine has been closed down owing to the loss of the contract to furnish the M. K. & T. R. R. with coal.

HUNTSVILLE POSTOFFICE

John Breckenridge—Mines located in the vicinity of Huntsville. These are the mines reported under the name of the Randolph County Coal Co. last year.

Mine No. 1½—Is a shaft 98 feet deep, equipped with fair machinery for hoisting the coal and ventilating the mine.

We made an inspection of the plant December 2, and found the mine being well ventilated and in fair condition. An escapement shaft had just been sunk, located about 175 feet north of hoisting shaft.

The coal is from 3½ to 4 feet in thickness, separated by a band of fire-clay, which varies from an inch or two to several inches in thickness.

Roof fairly good in most places, for this district, but it must be remembered that as a general thing but little good roof is found in this vicinity.

Mine No. 3½—Is located within the city limits of Huntsville, and connected with the Wabash railway by a switch.

This is also a steam plant; shaft 65 feet deep. At date of inspection a 10-foot fan was being used, which was located in the ventilating chamber at shaft landing. However, a 12-foot fan was being erected at the escapement shaft, which had just been sunk.

This fan doubtless made a great improvement in the air-current when put in operation.

Several measurements of air were taken at date of inspection (December 1). The first was taken near the bottom of hoisting-shaft, and showed 10,700 cubic feet to be passing per minute; second near the head of main entry only showed 3590 cubic feet per minute, thus showing that nearly two-thirds of the air was leaking through doors, stoppings, etc., and returning to the fan without reaching the working face. From these figures it appears that the mining boss could utilize some of his time to good advantage by closing up some of these leaks, and cause more of the air-current to pass around the workings.

The coal is from $3\frac{1}{2}$ to 4 feet in thickness, and worked on the pillar-and-room plan.

Roof not good, therefore it requires careful timbering to keep it secure.

Coal consumed in Missouri, Kansas and Nebraska.

T. M. Elmore & Co.—Mike McHugh, mining boss; mine located at Huntsville; connected with the Wabash railway by a switch.

We made an inspection of the inside workings December 1, and found about 35 men employed. The work was confined to a block of coal consisting of several acres lying just east of the shaft. The old abandoned workings which adjoin it were giving off considerable black damp (C. O.²), thus causing the operators and miners much annoyance. We also observed that the mining boss was neglecting to keep brattices and stoppings properly closed, hence the greater portion of the air-current was being lost before reaching the workmen. The attention of Mr. McHugh was called to these facts, and he was instructed to have the matter attended to at once, and as we have had no complaint from any of the employees, we have no doubt but that our instructions were complied with.

The seam of coal is the same as that worked in the other mines in this vicinity. It is about $3\frac{1}{2}$ to 4 feet thick and worked on the long-wall plan.

Since the above was written, we have been advised that this property has changed hands, and is now operated by the Caffrey & Baker Coal Co.

Emanuel Edwards—Drift; located near Huntsville. Coal $3\frac{1}{2}$ to 4 feet thick, and worked on the pillar-and-room plan.

The mine is operated to supply local trade.

John Lowes—Mine is located in the city limits of Huntsville. The coal is from $3\frac{1}{2}$ to 4 feet in thickness, and worked on the pillar-and-room plan. The product is used to supply local demand.

Wm. E. Mitchell & Co.—Drift; located at Huntsville. The coal is from $3\frac{1}{2}$ to 4 feet in thickness, and worked on the pillar-and-room plan.

The mine was only in operation during a part of the year. Most of the output is consumed in the vicinity of the mine.

R. L. Rutherford & Son—W. T. Rutherford, mining boss. This mine is located about one-half mile west of Huntsville, and was reported in last year's report as the Eureka Coal and Mining Co.

The coal is from $3\frac{1}{2}$ to 4 feet in thickness, and worked on the pillar-and-room plan. The product being hauled in wagons to the railroad switch, and shipped to market.

Our inspection was made December 2, and we found that a sufficient amount of air was not passing around the workings. This was attributed to two causes: first, an inadequate furnace; and, second, small air-course through which the ventilating current had to pass. The attention of the mining boss was called to the matter, and he stated that he would make the necessary improvements suggested at once. No complaint has been made to this office by the miners.

Mike Strife—Mine located at Huntsville. Drift; mine operated to supply local demand. Coal reported as being about $3\frac{1}{2}$ to 4 feet in thickness.

This is the mine formerly operated by John Rodgers.

MOBERLY POSTOFFICE.

Moberly Mutual Coal company—P. J. Perkins secretary. Mine located about 2 miles west of Moberly. Horse-power; shaft 105 feet deep. The coal is about 3 feet 8 inches in thickness and worked on the pillar-and-room plan. The product is consumed in Moberly mills, factories and domestic purposes.

Harry Ward—Mine located about $2\frac{1}{2}$ miles west of Moberly; shaft about 88 feet deep. We made an inspection of this mine December 3, and found only about 7 or 8 men employed. The coal is the same as that worked in the above named mines; it is hauled to Moberly in wagons.

A number of small mines are in operation during the fall and winter, located from 3 to 4 miles west of Moberly. Among those reporting are W. K. Robuck, Young & Co., John Schneider, and J. B. Williams & son.

RENICK POSTOFFICE.

Renick Coal company—E. L. Hubbard, sup't. Mine located at Renick, and connected with the Wabash railway by a switch. This property was reported in our last annual report under the head of the Enterprise Mining Co. The name of the company was changed about the 1st of January of this year.

The plant is equipped with good machinery for hoisting the product. At date of inspection (December) 3, only a few men were employed, and we have since been notified that but little work has been done during the entire year, on account of not having a market for the coal.

The coal is the same seam as that worked at Higbee and Huntsville, but the roof does not appear to be as good as it is at either of the other places; hence careful timbering is necessary.

Ventilation was being produced by the exhaust from the steam-pump.

THOMAS HILL POSTOFFICE

Joseph Milburn & Sons—Mine located near Thomas Hill; shaft 50 feet deep; horse-power. Here the coal is reported to be over 4 feet in thickness, and is said to be the same seam as that worked at Huntsville, some 10 mile southeast.

Mr. Milburn writes us that the decrease in the output during the past year is due to a break-down in his hoisting apparatus.

The output is used to supply local demand.

Small mines are being operated near Jacksonville by Harvey Dean and James Reed, and Mrs. Catherine Mathis is operating a mine near Rolling Home. Here the coal is reported to be over 4 feet in thickness. These mines are only operated in a small way to supply local demand.

RAY COUNTY.

Production, 272,948 tons.

Ray county ranks among the large coal-producing counties of the State. Its principal mines are located in the vicinity of Richmond, Camden, Orrick, Fleming and Swanwick. Small mines are also in operation in other parts of the county to supply local demand. This is the same seam of coal worked so extensively across the river in Lafayette county. It is found from 18 to 24 inches in thickness. The Wabash and Santa Fe railways pass through a portion of the coal fields in the county from east to west, and the St. Joe branch of the Santa Fe railway from northwest to southeast, furnishing good shipping facilities for the product.

During the past year there has been 272,948 tons of coal mined, valued at \$1.54 per ton, or a total value of \$421,631.61. In producing this amount of coal there was an average of 895 persons employed in and about the mines during the year.

Following is a partial description of each mine, together with a statement as to the condition in which they were found on dates of inspection:

CAMDEN POSTOFFICE.

Bovard-Brown Coal company—B. Lusk, manager, and G. W. Thomas, mine boss. The plant is located about 2 miles east of Camden and connected with the Santa Fe railway by a switch.

Mine was not in operation at date of our inspection, although several miners were at work, preparing coal for the following day. The

mine makes considerable water during the winter months, but is fairly well drained.

From 50 to 60 men and boys are furnished employment in and about the shaft.

Cravins' Coal company—Samuel Sevier, manager. Mine located about 1 mile east of Camden; connected with the Wabash R. R. by a switch. Since last inspection a new hoisting engine has been erected to take the place of the old horse hoister. The shaft is about 28 feet deep and the coal 20 inches thick; worked on the long-wall plan.

Two mines owned by the Richmond Coal Company are located just west of Camden, but as the company owns and is operating other mines in the county with general office at Richmond, these mines are reported under that postoffice.

FLEMING POSTOFFICE.

Kansas & Texas Coal company—B. F. Hobart president and Robert J. Paterson mining superintendent. Mine located at Fleming, and connected with the Wabash R. R. by a switch, but the general office of the company is in St. Louis.

Steam-plant; shaft 73 feet deep. Ventilation is produced by a 12-foot fan, which was giving fair results at date of inspection: that is, a good current of air was passing around the face; but as the whole volume passed along the face in one current, it traveled with such velocity that it was annoying to the miner. If the speed of the fan be reduced so as to lessen the velocity, foul air would collect, caused by the breathing of men and animals, and combustion from miners, lamps etc—The former being uncomfortable and the latter unhealthy.

In order to overcome this difficulty, the superintendent at our request split the air at head of main north entry into two currents, and notified us of the change, which we have no doubt has made a great improvement in ventilation. The superintendent has also notified us that he has cleaned out and put in a new ladder in the escapement shaft since our inspection, and has also repaired and put new ropes on cages.

An attempt was made last fall to make a roadway high enough for the passage of mules, leading from the south side of shaft-bottom to the west coal face, but in shooting down the roof, seams or fissures were encountered, through which such large quantities of water came that it was thought best to abandon the enterprise. The entry is now being used as a return air-course.

About 1800 feet of the east breast has been abandoned for the time being, on account of the coal dipping to the southeast, which required extra mule-power to bring the coal to the bottom. The coal is about 2 feet thick and overlaid with a good roof, which requires but little timbering, either at the working-face or along the roadways. Several inches of slate comes down with the coal, which, together with the mining-clay, is used to build pack-walls upon which the roof settles.

The mine furnishes employment to from 110 to 150 men and boys. Product consumed in Missouri, Iowa, Kansas and Nebraska.

HARDIN POSTOFFICE.

H. A Dickson & Son—Mine located about $3\frac{1}{2}$ miles north of Hardin.

Shaft 83 feet deep; horse-power. Coal about 18 to 20 inches thick and worked on the long-wall plan. I have been notified by Mr. Dickson that the tip-house took fire last February 11, and burned down, since which time the mine has been idle.

Fred. Buchlinger—Drift; located 4 or 5 miles north of Hardin. Coal 18 inches thick and worked on the long-wall plan.

Hartwell, Arnold & Co—J. W Turner, sup't. Mine located 4 or 5 miles north of Hardin, but the superintendent's address is Norborne, Carroll Co.

The coal is about 18 inches thick and is brought to the surface through a drift.

Joseph Huston—Drift; mine located $4\frac{1}{2}$ miles north of Hardin. The mine only employs a few men in fall and winter to supply local demand.

Wm. Phillips—Mine located about $3\frac{1}{2}$ miles north of Hardin, but his postoffice address is Norborne, Carroll Co.

Coal is about 18 inches thick and worked on the long-wall plan. He writes us that he has just opened a new mine, and for that reason his output is small.

Wm. Sickles—Mine located about $4\frac{1}{2}$ miles north of Hardin; but his postoffice address is Norborne, Carroll Co. The coal is about 18 inches thick and brought to the surface through a drift. It is used to supply local trade.

ORRICK POSTOFFICE.

Bissell Coal company—John Bissell, superintendent, and John Johnston, mining boss. Mine sunk last fall, striking coal at a depth of 65 feet. It is located about 1 mile north of Orrick.

The shaft is equipped with a good hoisting engine of ample capacity for the work required of it. The head-house, engine-room, etc., are also well constructed for a plant of this character.

The coal is the same seam as that worked so extensively around Richmond, Camden, and other places in the county. It is from 18 to 24 inches in thickness, overlaid with a good roof, such as overlies the coal in other parts of the county. But little fire-clay is found under the coal—in fact there is none in some places—which is very unfortunate for both miner and operator. The mine makes considerable water.

From 17 to 36 men and boys are employed, according to the demand for the product.

RICHMOND POSTOFFICE.

Black Diamond Coal company—Wm. Pence superintendent. Mine located at Richmond. Shaft 80 feet deep; horse-power. Mr. Pence informed us that he would soon sink a new shaft, after which he would abandon this one. The coal is about 24 inches thick and worked on the long-wall plan.

M. Ohew (Col.)—Mine located about $1\frac{1}{2}$ mile northeast of Richmond, on James Randall's land. Shaft 95 feet deep; horse-power. Mine was put in operation last fall; coal used to supply home trade.

Darneal Coal company—John Hubbell manager, and John W. McCart mine superintendent. Mine located about one mile west of Richmond, and connected with the St. Joe branch of the Santa Fe R. R. by a switch.

The coal is brought to the surface through a vertical shaft 108 feet deep, a horse hoister being in use.

Ventilation is produced by a small furnace which was giving fair results at date of inspection (March 25), except along a portion of the extreme east breast—this deficiency in air being the result of not having a return air-course. The escapement road was in bad condition, having been neglected until the roof had settled down, leaving the passage not more than 18 inches high. The superintendent's attention was called to this matter, and he gave orders to the mine-boss to put men to work at once to clean out the escapement roadway, and at the same time make a return air-course for the ventilating current on the east face. We are in receipt of a letter from the superintendent stating that the escapement road in question has been put in good condition.

The mine is well drained, and, with the above exceptions, in good condition.

W. Douglass—Mine located about one mile east of Richmond; shaft 59 feet deep; horse-power. The mine was idle at date of our visit, hence no inspection was made of the inside workings. This mine was formerly operated by Mosby & Allison.

Hubbell Mining company—John Hubbell, manager, and John W. McCart, mine superintendent.

This is a steam plant; shaft 110 feet deep. Mine connected with the St. Joe branch of the Santa Fe railroad by a switch.

We made a careful examination of the mine March 21, and found the underground workings reasonably well ventilated and in good condition, but the cages needed repair, and we so informed the superintendent, who promised that he would have them put in proper order at once, and on the 25th inst. he notified us that the east cage had been repaired and now being used in hoisting and lowering the employes, no one being allowed upon the other cage.

A roadway is kept open between this mine and No. 7, which affords a good escapement in case of an accident to the main hoisting shaft.

The coal is from 24 to 26 inches thick, and overlaid with a beautiful rock roof, which renders it well adapted for the long-wall plan, which is used. Several inches of draw slate, which overlie the seam, comes down with the coal, and is used in building walls along the roadways and working face.

The mine was idle last summer, but in winter it furnishes employment to about 70 or 80 men and boys.

Most of the product is consumed in Kansas City and St. Joseph.

Hubbell, Hyatt and Hubbell Coal company—Mine located within the city limits of Richmond, and adjoins the Hubbell Mining Co.'s mine on the northeast. The shaft is 114 feet deep, equipped with good machinery for hoisting, etc.

Ventilation is produced by a furnace, located near the bottom of shaft. The air is carried down the hoisting shaft and along the main entry to face of coal, where it is split into two currents, one passing to the right and around the face to the furnace, and the other to the left and around to the furnace, in the same manner.

The furnace was giving fair results at date of inspection (March 21), considering the number of men employed, but we are of opinion that it would be inadequate during the summer months to properly ventilate the mine unless the working forces are reduced. However, no complaints have been received from the employes since our inspection.

The mine superintendent informed us that another opening would soon be made between this mine and Hubbell Mining Company's mine, thus affording an additional escapement road.

Pay for mining, \$1 per ton, summer and winter.. Coal from 24 to 26 inches thick and worked on long-wall plan.

The product is consumed in Missouri, Kansas and Nebraska. John Hubbell manager, and John W. McCart mine superintendent.

Murray & James—Shaft 65 feet deep ; horse power. The mine was sunk last fall and is only operated to supply local trade. The coal is the same seam as that worked so extensively throughout the county.

Joseph Pickering Coal company—Mine located about 1 mile west of Richmond, and connected with the St. Joseph branch of the Santa Fe R. R. by a switch.

Shaft 107 feet deep, equipped with good hoisting machinery for a plant of this character. Ventilation is produced by a furnace, which is located near the shaft-bottom, a part of which is bratticed off from the main shaft and used as a ventilating chamber. The furnace was giving good results at date of inspection (March 25).

A connection was made about a year ago with the Darneal Coal Co.'s mine which is used as an escapement road, and was also in reasonably good condition.

We found a boy by the name of Bert Sneid working with his father, who said that he was only 11 years of age, so we sent him home and gave instructions to the mine-boss, Wm. Main, to see that no boys be permitted in the future to enter the mine for the purpose of working, unless they had attained the age required by law.

Coal about 24 inches thick and worked on the long-wall plan.

The product is consumed in Missouri, Kansas and Nebraska.

W. D. Rankin & Co.—W. D. Rankin, of Lexington, manager. The mine is located about 1 mile northwest of Lexington Junction, connected with the St. Joe branch of the Santa Fe R. R. by a switch.

The coal is brought to the surface through a drift. The mine was idle at date of inspection, and had been for 2 or 3 weeks, and as the superintendent did not know when the mine would commence operation again, we did not deem it necessary to make an investigation of the inside workings.

Richmond Coal company—J. S. Hughes, president, and John Gibson, superintendent. Mines located along the Wabash and Santa Fe railways. This is decidedly the largest coal producing company in the county ; indeed, but very few in the State excel it. The company is operating 6 mines, which furnish employment to from 350 to 500 men and boys, governed, of course, according to the demand for the coal.

All the mines are worked on the long-wall plan, the roof and surroundings being well adapted for the same. The coal is from 20 to 24

inches in thickness, overlaid with slate, which comes down with it, and is used in building pack-walls along the face and roadways to support the roof.

Following is a partial description, together with statement showing location of each mine:

Mines Nos. 1 and 2—Are located about one mile west of Camden and connected with both the Wabash and Santa Fe railways. Both shafts are equipped with good machinery and tip-houses, and No. 1 has 10 railroad chutes for coaling engines.

Mine No. 2 was not in operation at date of inspection (March 23), having closed down for the summer, but a large force of men was employed in No. 1.

Ventilation is produced by two furnaces, one located in No. 1 and the other in No. 2. The air is carried down No. 1 shaft and along the main entry to the face; here it is split into two currents, one passing around the coal face to the right and thence to the furnace in mine No. 1, and the other current passing along the face to the left and to the furnace in No. 2.

Mine fairly well drained and in good condition.

The mines being connected, one furnishes an escape for the other. Chas. Cartwright is mining boss.

Mine No. 3—Located about two miles south of Richmond and connected with St. Joe branch of the Santa Fe railroad by a switch.

Shaft 50 feet deep and equipped with fair machinery for hoisting the product and draining the mine.

The mine is connected by underground roadways with mines Nos. 4 and 5, thus furnishing good escape for the employees.

Ventilation is produced by a 12-foot fan, which is located at No. 5, and also used to ventilate No. 4. The fan was giving good results at date of inspection (March 22).

The mine is in reasonably good condition, except some of the roadways, which were very wet and muddy. However, some of them had been corduroyed and much improved since our last inspection.

Mine No. 4—Is located about 200 yards north of No. 3. It is also a steam-plant, and furnishes employment to more men than any other one of the company's mines. Shaft 75 feet deep. Ventilation is produced by a 12-foot fan, located at No. 5, which was giving good results at date of inspection. This plant, like Nos. 3 and 5, has been in operation for a number of years, producing large quantities of coal, and is therefore very extensive. Some of the roadways are wet and muddy, but the general condition of the mine is good.

Mine No. 5—Is also a steam-plant and adjoins No. 4 on the north-west. The shaft is 75 feet deep.

We visited and made a careful examination of the mine March 22, and found that the safety catches on north cage were in poor condition, nor would the safety catches on the other cage work properly. On calling the attention of the superintendent to the matter, he assured us that the safety catches would receive prompt attention. After going all through the mine, we then went along the face of coal in No. 4, thence around the working face into No. 3, to ascertain if the escape-ment roads were in proper condition to insure safety to the workmen. While the escapement roadway between No. 4 and 5 was very low in places, it was open and could be used if necessary. The road between 3 and 4 was in good condition.

A 12-foot fan is used to ventilate the mine. It is located a short distance from the main shaft.

It is also used to ventilate Nos. 3 and 4. Since its erection in the spring of 1891, not a word of complaint has been received from the employes in regard to ventilation, whereas prior to its erection several complaints were made, and we have been told by the officials of the company that they are well pleased with the fan and the improvement it has made. From this we can readily see the advantage to be gained by the erection of ventilating fans to take the place of furnaces, which predominate in this county.

Many mine operators and managers do not seem to understand why it is the small furnace, which, as they say, "has been in use for the past six or eight years, should fail to continue to give proper results." They doubtless overlook the fact that the working face in the mine is extending each year, and necessarily increasing the distance the air-current has to travel, and which has the effect of adding that much more friction in the passage of the air.

Roof and roadways in good condition and mine fairly well drained.

Mine No. 9—Is a horse-power. It is located about $\frac{1}{2}$ mile west of Richmond; connected with the St. Joe branch of the Santa Fe railway by a switch.

Mine not in operation on date of our visit, hence no inspection was made of the inside workings.

SWANWICK POSTOFFICE.

Williams Coal company—J. R. Williams, sup't, and F. M. Lamb, mining boss. Mine located at Swanwick and connected with the St. Joe branch of the Santa Fe railway by a switch.

Horse-power; shaft 95 feet deep. This is the same seam of coal as that worked in the vicinity of Richmond and other parts of the county; but the seam is more obstructed by faults in the roof.

The mine has been in operation for a number of years, and is therefore very extensive. We visited and made an inspection of the mine in March last, and found the underground workings fairly well ventilated and in good condition.

H. W. Sater & company—Is operating a mine located between Georgeville and Finney's Point, for local trade.

The shaft is 156 feet deep; horse-power. Coal about 22 inches thick, and said to be the same seam as that worked so extensively in the vicinity of Richmond.

SALINE COUNTY.

Production, 4440 tons.

According to the report of the State Geologist, coal measure formation underlies nearly one-half of the county. But thus far mining has been pursued only in a limited manner to supply local trade. The principal mines now in operation are located in the vicinity of Sweet Springs, Slater and Mount Leonard. However, some local mining is being prosecuted at other points throughout the county.

R. M. Cordell—Mine located at Mt. Leonard; horse-power. The shaft was sunk last winter, striking the coal at a depth of 50 feet. Coal is reported to be 20 inches thick.

H. H. Marmaduke—Mine located about $1\frac{1}{2}$ mile southwest of Sweet Springs. Is a horse-power; shaft 60 feet deep. Coal 18 to 24 inches thick, overlaid with a shale roof, several inches of which comes down with the coal, thus giving height for the workmen. Much trouble is given the operator by gob fires, caused by spontaneous combustion.

Mr. Marmaduke informs us that work was discontinued in mine July 1, owing to limited demand for the product, but doubtless will resume operations this fall.

Wilburn Coal company—Mine located about two miles north of Napton. Shaft 65 feet deep. The coal is found here in a deposit which is said to be 22 feet thick. However, only about 8 feet is being worked.

Mine was idle at date of our inspection, and had been for several weeks, on account of bad condition of the country roads over which the product had to be hauled to market. But we were informed that the mine would soon be put in operation again.

Wm. M. McGinnis, near Cretcher, Peter Durnil and Samuel White, at Elmwood, Barney Hunter and Isaac Briggs, near Slater, Frank Alexander, near Arrow Rock, and others, are among the small operators which have contributed to the output of the county during the past year.

SULLIVAN COUNTY.

Production, 8800 tons.

Milan Land and Coal Mining company—E. Ritz, superintendent. Mine located at Milan, and connected with the O. B. & K. C. railroad by a switch. Shaft 190 feet deep, equipped with good hoisting machinery.

We visited the mine March 5, but could make no inspection of the inside on account of cage being broken, caused by over-winding. But we returned to the mine and made a thorough inspection of the underground workings on the 9th inst., and found it in fair condition. The coal is from 38 to 42 inches in thickness, overlaid with a very poor roof, which slacks readily on being exposed to the air. In fact, the roof seems to fall more along the entries and in narrow work than in rooms. The coal was being worked on the pillar-and-room plan at the time of our visit, but we are informed that the plan has been changed to the long-wall.

Pay for mining, 65 cents in summer and 80 cents in winter.

ST. CLAIR COUNTY.

Production, 5405 tons.

Mining is being done in the vicinity of Osceola, Vista, Lowry City, Taberville and south of Appleton City, but only in a small way to supply local trade, except at Vista, where the coal is mined more extensively, the product being shipped by rail to market.

W. A. Seymour—Mine located about $3\frac{1}{2}$ miles northwest of Osceola and known as the Hoover bank. At date of inspection they were sinking a slope to the coal, which is 28 to 30 inches thick. The product is hauled to Osceola in wagons.

William Watkins—Mine located about $3\frac{1}{2}$ miles northwest of Osceola.

At date of inspection, the mine was idle. Slope. Coal reported 28 to 32 inches thick. It is worked on the pillar-and-room plan.

D. L. Douthat—Mine located at Vista. The shaft was sunk in 1890, striking the coal at a depth of 20 feet. At date of our visit the mine

was partly filled with water, caused by the heavy rains which had recently fallen; hence no inspection of the inside workings could be made. The coal is reported as being three feet thick and overlaid with limestone.

G. A. Vannice—Mine located at Vista and connected with the K. C., Ft. S. & M. railroad by a switch. The mine was formerly operated by the Owen coal company, but was closed down last fall and remained idle until January, at which time Mr. Vannice took charge and commenced operations. Coal is from two to three feet thick, and is brought to the surface through a slope. Only a small force of men was employed at date of our inspection.

J. W. Whiteaker—Is operating a mine located a few miles north of Osceola for local trade. Shaft 24 feet deep; horse-power. Coal two feet thick; worked pillar-and-room plan.

VERNON COUNTY.

Production, 119,036 tons.

Nearly the whole of Vernon county is underlaid with the coal-measure formation and mining is or has been prosecuted in nearly every township within her borders.

Mining was being carried on very extensively in the vicinity of Carbon Centre a few years ago, but the principal producing mines in this vicinity were abandoned about four or five years ago, which resulted in a large decrease in the county's output. But a brighter future is in store for the mining industry of the county, as several large coal companies are turning their attention to its coal fields, which will doubtless attract the attention of other capitalists. The indications are now that the county will in a few years rank as one of the State's largest producers; in fact, her output is increasing very rapidly. During the past year the output was 119,036 tons, against 64,303 for the preceding year, an increase of 54,733 tons. In producing this amount of coal an average of 252 men and boys were employed in and about the mines.

The seams now being worked vary from 18 inches to 5 and 6 feet in thickness. The one attaining the greatest thickness is found in the vicinity of Carbon Centre and near Bedford. Several small mines and strip-pits are in operation in the vicinity of Walker, Moundville, Bellamy, Bronaugh, Schell City, Sheldon, Milo, Nevada and Ketterman.

The Missouri Pacific R'y passes through the county from north to south, the M. K. & T. railroad from northeast to southwest, and a

branch of the K. C. Ft. S. & M. railway extends to Carbon Centre, one of the principal shipping points in the county, thus affording good shipping facilities for the product.

Following is a partial description of each mine, together with a statement as to the condition they were found in on date of inspection :

CARBON CENTRE POSTOFFICE.

R. E. Allen—Mine located near Carbon Centre, but postoffice address Rich Hill, Bates county. Mine was not in operation at date of our visit, but had been operated during last fall by J. Street. Mr. Allen reports several thousand tons of coal as having been stripped and sent to market from this land during the past year.

Salsman & Scott—Have a lease on a portion of the R. A. Boughan tract, upon which this mine is located.

The coal is obtained by stripping the dirt and clay from over it and quarrying it out. We are informed, however, that they have recently commenced opening up a slope.

Wm. O'Bryan & Co—Mine located near Carbon Centre. This company did a large business last fall and part of the winter, closing down about the 1st of January. Coal was also mined by stripping, and shipped to Kansas City and west, over the K. C. Ft. S. & G. R. R.

Mr. O'Bryan informed us that the company would discontinue business and remove their stock of goods to some other point.

J. N. Smith—Strip-pit was not being operated at date of inspection. But is worked during fall and winter, while the demand is good.

MOUNDVILLE POSTOFFICE.

W. D. Robinson—Mine located at Moundville. Shaft 32 feet deep; horse-power. The mine is being operated at this date by W. H. Cooper. Coal about 30 inches thick and worked on the pillar-and-room plan. Mine operated to supply local demand.

Warner Powell—Mine was idle at date of our visit and had been for several months, hence no inspection was made.

Philip Jones—Mine located near Moundville, and was being operated at date of inspection by John Stout. The shaft is about 30 feet deep; horse-power. Coal 30 inches thick and worked on the pillar-and-room plan. The product is used for home consumption.

Wm Hill—Mine idle and had been for several months, therefore no inspection was made.

SCHELL CITY POSTOFFICE.

H. G. Mosher—Mine located about two miles south of Schell City. It was opened last March by D. E. McCarty, who reports the coal as being 26 inches thick. The mine will be worked on the pillar-and-room plan, and the output used to supply local trade.

Mr. McCarty also reports several other small mines in the vicinity of Harwood that are operated in fall and winter.

RICH HILL POSTOFFICE

(Bates County).

Keith & Perry Coal company—John Perry general manager, David Mackie general superintendent, and George D. Manville agent. This is one of the large coal companies of the State, with general office at Kansas City, Mo.

Mine No. 7—Is practically a new mine, having been opened a little over one year ago, therefore the underground workings are not very extensive. The shaft is located about 3 miles south of Rich Hill, just within the border of Vernon county, and connected with the Missouri Pacific R. R. by a switch.

Several inspections were made of this mine during the past year, some of which were brought about by accidents at the mine, requiring our attention.

(A report on these accidents will be found elsewhere under the head of explosions.)

An escapement road was completed to the escapement shaft in November, and a good stairway erected in the shaft, and in January the company erected a 14-foot fan at the air-shaft, to take the place of the 10-foot fan, which was situated at the hoisting shaft.

Air measurements which we made on the 6th of February showed 20,380 cubic feet per minute to be passing, with the fan making about 54 revolutions per minute. But when it was increased to the speed usually run while shots are being fired, the amount of air was increased to 33,430 cubic feet in the same time.

The coal averages about 4 feet in thickness and is worked on the pillar-and-room plan.

Shot-firers are employed to fire all shots after the miners and other workmen have retired from the mine; and no miner is allowed to take more than 12½ pounds of powder into the mine at any one time, and that in a closed vessel. These are good rules and are heartily indorsed by us.

The mine is practically dry, but little water being found in it, except at the shaft-bottom, and head of main north entry. At these places small quantities of water collect, a large percent of which is used to sprinkle roadways, etc.

Mr. Williams is mining boss, having succeeded Pat Harding.

The company has recently sunk a new mine known as No. 8, a short distance south of Bedford, and a switch is being laid connecting the mine with the Missouri Pacific railway also. The plant will be equipped with good machinery, as the company has quite a large territory to work out.

The output from mine No. 7 alone during the past year is more than the total production of Vernon county for the year ending June 30, 1891. This fact goes to show that the county is rapidly coming to the front as one of the large coal producers.

Chaney & Burch—Are operating the strip-pit near Bedford, formerly operated by Mr. Harris, and also stripping coal on G. A. Dolser's land located about 1 mile west of Carbon Centre. Two beds of coal are found at the latter place, one 16 and the other from 36 to 38 inches thick, separated by from 3 to 5 feet of fire-clay and shale. The small seam overlies the larger one,

The product is hauled to the railroad in wagons and shipped.

Frank Williams & Co—Capt. Wm. Hudson, manager, and Frank Williams, mine sup't.

This is a new mine, having been put into operation during the past year. It is located about $1\frac{1}{2}$ mile northeast of Arthur and about 1 mile east of the Mo. P. railway. A tram-road connecting the mine with the switch from the railroad has been built. The coal was struck near the surface, hence worked to considerable extent by strip-pit, but at date of inspection (Feb. 12), a drift was being driven in to the coal under the hill. The vein is from $4\frac{1}{2}$ to 5 feet in thickness, overlaid with a good shale roof.

Pay for mining, 50 to 60 cents per ton. Product is consumed in Missouri, Kansas and Nebraska.

REMARKS ON TABLE VI.

The following tables are descriptive of the details of coal mine operations in the State.

The table shows the number of mines, kind of power used, plant, employes, mules, tonnage, prices paid for mining, prices received for coal, total output and total amount received for same, in each county from which mining is reported; also the number of fatal and non-fatal accidents occurring. The tables following after the above represent each county in alphabetical order, and its mining operations in detail.

In connection with these tables, we desire to call attention to some features which, if not explained, may prove misleading or be misunderstood; the first of which is the apparently small product of some mines, compared with the number of men employed. This may be explained by the fact, that at a number of mines the force reported represents the true number employed, but they can not be said to be regularly employed, as in many cases work is performed only a few months in the year. Then again, there are many small or thin veins of coal, and when this is the case, more men are required to mine a given number of tons than would be necessary in thicker veins.

We have used every effort to get operators to report the number of days worked during the year, but with such indifferent success as to prove discouraging. There are many pleasing exceptions, but in many other instances there appears to have been no attempt to keep a record of this, to us at least, very important matter. There are no means by which this information could be obtained by this department except through personal effort, and this is simply out of the question when considered in connection with the duties required in other and more important directions, with no assistant and the very limited means at my disposal. Still another feature may be noticed, and that is the wide difference in the prices received for the product by different mines. Mines reporting extra large prices received for coal are to be found mostly in isolated places, where competition and transportation facilities are lacking. And again there are others known as country banks, the trade of which is confined to the immediate neighborhood, and the mines operated at such times only as the season and the demand insure good prices. Then there are many large operators in reporting the average price received for the output of their respective

mines, who furnish a figure the result of the average from the sale of lump, nut and slack combined. Prices of this kind may look as much too small as others look to be too large.

It may be noticed that prices are not given for mining done in strip-pits. In explanation of this, we would state that as a rule this kind of work is performed by ordinary labor, in the majority of cases.

The professional miner is not in demand at prices which would obtain in underground work. The prices paid for strip-pit mining are so varied and so unsteady as to make the record useless for all practical purposes.

No record of mules employed in strip-pits has been attempted, for reasons somewhat similar to those given for the failure to notice prices paid for strip-pit work. The work done by a strip-pit mule bears no resemblance to that required of a mule in underground work. Some very small strip-pits work a number of mules, for a few months, in scraping the earth and other material overlying the coal from off the same, and in reporting to us, give a number of mules as being worked in excess of the number used by our largest shafts.

TABLE VI.

SHOWING BY COUNTIES THE CHARACTER, TONNAGE AND VALUE OF OUTPUT OF COAL MINES IN MISSOURI FOR
YEAR ENDING JUNE 30, 1892.

Counties.	Kind of power.		Kind of opening.				Number of mines.		Kind of ventilation.		Mode of working.		No. of kegs of powder used.		Cost of powder.		No. of mules empl.		Employees.				Casualties.		Total No. of tons mined.		Average price per ton received at the mines.		Amount received for output at mines.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
	Steam.	Horse.	Shaft.	Slope.	Drift.	Strip-pit.	Furnace.	Fan.	Long-wall.	Pillar and room.	Total.	Miners.	Others.	Winter.	Summer.	Winter.	Summer.	Winter.	Summer.	Fatal.	Non-fatal.	Fatal.	Non-fatal.	Fatal.	Non-fatal.	Average price per ton received at the mines.	Amount received for output at mines.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

Vernon.....	1	5	4	1	2	33	4	1	6	8,007	5,977 25	9	9	262	144	64	84	328	178	8	1	119,086	1 08	129,196 17
Totals	74	123	153	76	115	105	113	49	131	211	53,450	116,146 85	353	7663	4924	2036	1485	9689	6419	20	41	3,017,265	\$1,265.8	3,525,823 57
Totals for 1891.....	64	98	140	67	97	81	385	105	42	...	55,853	119,504 05	301	269	4333	1563	1221	8104	5654	18	32	2,650,018	1 31.35	3,490,868 83
Increase '92 over '91.	10	27	17	9	28	24	68	8	7	...	...	...	52	...	1122	501	274	1595	765	2	9	367,267	04 55	344,981 74
Decrease from 1891.....	...	...	...	...	...	...	...	...	...	...	1,906	3,357 20	...	16	...	...	...	...	...	...	...	...	...	...

TABLE VII.
CHARACTER, TONNAGE AND VALUE OF OUTPUT OF COAL MINES IN MISSOURI.
ADAIR COUNTY.

Name of person or company operating mine.	Kind of power opening.		Diameter depth of shaft—feet	Kind of ventilation		Diameter of fan.	Mode of working		Average thickness of vein	No. of kegs powder used during year	Cost of powder for the year	Mules.		Employees.						Av. price per ton for mining.		Total number of tons mined	Average value per ton at mine	Amount received for the total output of the year
	Steam	Horse		Furnace	Fan		Long wall.	Pillar and room				Summer	Winter	Miners.	Others.	Total.	Summer	Winter	Summer	Winter				
Ford, A.	1						1	3 10						2	2	8	1	1	1 00	400	1 25	\$500 00		
Harrett Bros.		1						3 8						9	11	2	1	1	1 00	320	1 50	1 480 00		
Ledford, Jacob.		1					1	3 8						2	4	3	1	1	1 00	600	1 50	1 350 00		
Gentry, R. A. (C.)	1		50		1	10	1	3 8	325	\$775 00		1	32	24	2	56	28	87%	87%	11,000	1 75	19,250 00		
Sanko, Robert B.		1			1	1	1	4 2				1	6	6	2	12	7	75	75	1,000	1 95	1,950 00		
Scott, D. C.		1	60		1	1	1	3 6					2	2	2	4	2	1 00	900	1 95	1,755 00			
Stanley, S. H.							1										2	1 25	1 25	140	1 50	210 00		
Totals.	1	3	2	1	4		7		825	775 00		8	1	53	24	77	28			14,820	1 65	24,365 00		

AUDRAIN COUNTY.

Andrain Mfr. and C. M. Co.	1	1	1	1	1	1	1	1	1	2 6	1	1	1	1	15	8	20	12	1	1 00	8,772	1 65	\$6,223 80
Dedenne, Omer	1	1	1	1	1	1	1	1	1	2 6	2	\$5 00	1	1	3	2	4	2	1	1 00	460	1 75	\$805 00
Eastham, C. P.	1	1	1	1	1	1	1	1	1	2 8	2	5 00	1	1	2	1	3	1	1	1 00	50	2 00	100 00
Howarth, John	1	1	1	1	1	1	1	1	1	3 6	1	1	1	1	3	1	4	1	1	1 25	200	2 00	400 00
Lynch, Owen	1	1	1	1	1	1	1	1	1	3 6	1	1	1	1	4	1	4	1	1	1 25	160	2 00	320 00
Montague, Jas. D.	1	1	1	1	1	1	1	1	1	2 6	4	7 40	1	1	4	1	4	1	1	1 25	300	2 00	600 00
Robbins & Matthews	1	1	1	1	1	1	1	1	1	2 4	1	1	1	1	1	1	3	1	1	1 00	250	1 75	437 50
Sherman & Bethel	1	1	1	1	1	1	1	1	1	2 6	7	1	1	1	60	40	10	8	1	1 00	1,500	2 00	3,000 00
Vandalia Coal Co.	1	1	1	1	1	1	1	1	1	2 4	1	1	1	1	5	5	10	5	1	88	22,137	1 65	36,525 05
Wiley, Frank	1	1	1	1	1	1	1	1	1	2 4	1	1	1	1	5	5	10	5	1	1 25	333	1 50	500 00
Totals.	2	7	9	1	1	5	1	6	8	8	8	17 40	103	54	21	13	124	67	1	1 00	29,792	1 68	\$50,164 85

BARTON COUNTY.

[illegible]

[illegible]

CHARACTER, TONNAGE AND VALUE—Continued.

BOONE COUNTY.

Name of person or company operating mine.	Kind of power.	Kind of opening.	Depth of shaft—feet.	Kind of ventilation.	Diameter of fan.	Mode of working.	Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.		Employees.				Av. price per ton for mining.		Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.
										Summer.	Winter.	Miners.	Others.	Total.		Summer.	Winter.			
Bennefield, B. S.	1	1	80	1	1	1	3	75	\$170 00	1	1	10	2	1	12	87.5	87.5	1,200	\$1 50	\$1,800 00
Centralia Coal Co.	1	1	112	1	1	1	3.2	12	15 00	2	2	25	5	30	27	80	80	1,760	2.13	1,600 00
Columbia Coal & M. Co.	1	1	1	1	1	1	3	10	28 00	2	2	22	5	27	2	1 00	1 00	10,322	1 53	16,033 00
Davis, Isaac	1	1	1	1	1	1	3.6	10	27 00	1	1	4	1	5	6	87.5	80	120	1 25	150 00
Gallner, James W.	1	1	1	1	1	1	3	4	32 00	1	1	6	1	7	2	87.5	87.5	809	1 25	1,132 00
Gooding, W. A. & Co.	1	1	50	1	1	1	3	4	9 00	20	6	2	1	22	7	87.5	87.5	5,333	1 50	8,937 00
Gossett, John F.	1	1	1	1	1	1	3.2	7	15 00	2	2	2	2	4	2	87.5	87.5	160	1 50	240 00
Jones, Walter	1	1	1	1	1	1	3.6	7	15 00	2	2	2	2	4	2	87.5	87.5	120	1 50	180 00
Petro, M. C.	1	1	1	1	1	1	3.6	7	15 00	2	2	2	2	4	2	87.5	87.5	120	1 50	180 00
Oldham, H.	1	1	80	1	1	1	2.5	1	2 25	1	1	1	1	2	2	87.5	87.5	391	2 25	879 75
Stidham, W. A.	1	1	1	1	1	1	3	1	3 00	1	1	1	1	2	1	80	80	200	1 50	300 00
Stone, J. W.	1	1	90	1	1	1	3.6	1	3 00	9	9	1	3	12	12	80	80	1,900	1 50	2,850 00
Wald, Andrews & Co.	1	1	1	1	1	1	3	1	3 00	2	2	2	2	4	4	80	80	140	1 50	210 00
Winterholer	1	1	1	1	1	1	3	1	3 00	2	2	2	2	4	4	80	80	140	1 50	210 00
Totals	6	5	2	1	6	2	6	286.5	590 50	8	3	93	37	14	7	107	44	21,033	1 54	32,590 25

CALDWELL COUNTY.

Caldwell Coal Co.	1	1	500	1	1	1	1.8	1	1	1	1	36	10	10	10	46	20	137	1 25	20,000
Coxwell Mining Co.	1	1	340	1	1	1	1.5	1	1	1	1	9	9	1	1	10	10	150	1 50	\$40,000 00
Hamilton Coal Co.	1	1	310	1	1	1	1.4	5	3	50	20	13	7	63	27	100	87 5	14,470	2 00	1,968 00
Kingston Coal Co.	1	1	240	1	1	1	1.3	1	1	25	25	8	8	33	53	1 25	1 25	2,879	1 50	23,640 00
Totals	4	4	1	3	4	4	1	5	8	120	64	33	26	102	90	.....	.....	58,333	1 98	76,697 16

CHARACTER, TONNAGE AND VALUE—Continued.

CHARITON COUNTY.

Name of person or company operating mine.	Kind of power.	Kind of opening.	Depth of shaft—feet.	Kind of ventilation.	Diameter of fan.	Mode of working.		Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.		Employees.				Av. price per ton for mining.		Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.
											Summer.	Winter.	Miners.	Others.	Total.		Summer.	Winter.			
Bruce, W. B.								1.8											20	\$2.80	\$50.00
Cowser, John D.								2											40	2.00	80.00
Faller, Joseph								1.6											8	2.60	20.80
Holloway, Z. T.								1.6											140	2.00	280.00
Hunten, John.								1.6											100	2.60	260.00
Iste, J. A.								1.6											80	2.60	208.00
Iste, J. Wesley.								1.8											84	2.50	210.00
Kinzie, Thomas								1.10											120	1.75	210.00
Kinzie, Geo. W.								1.9											160	2.50	400.00
Krueger, M. B.								2.4											723	1.75	1,265.25
Riddle, E. E.								1.1											20	2.40	48.00
Sackett, T. C.								1.10											420	2.50	1,050.00
Sweeman, A. G.								1.4											460	1.75	805.00
Williams, C. M.								1.4											460	2.00	920.00
Totals.											31	2							2,312	1.94	4,503.00

COLE COUNTY.

Elston Coal and Mining Co.	1	1	40																48	\$2.00	\$96.00
Leach & Co., Geo. H.	1	1	135						40	\$80.00									1,500	2.00	3,000.00
Totals.	2	2							40	80.00			3	3	4	2	7	5	1,548	2.00	3,096.00

CHARACTER, TONNAGE AND VALUE—Continued.

HENNEY COUNTY.

Name of person or company operating mine.	Kind of power.	Kind of opening.	Depth of shaft—feet.	Kind of ventilation.	Diameter of fan.	Mode of working.	Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.	Employees.						Av. price per ton for mining.		Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.
											Miners.	Others.	Total.	Summer.	Winter.	Summer.	Winter.				
																		Summer.				Winter.
Baldwin & Fonda	1	1	30	1	8	1	2:6	30	\$78 00	1	1	40	23	5	45	80	85	85	12,000	\$1 40	\$16,800 00
Braman & Harbit			35		1	1	2:6					6	4	12	20	10	62½	4,000	1 75	7,000 00	
Boyles, George		1					3:8	80	60 00			15	2	6	27	8	75	720	1 80	1,080 00	
Carpenter, Henry	1		75	1	8	1	3:8	100	210 00			15	4	3	19	6	85	5,400	1 80	7,020 00	
Co-operative Coal Co.			47				1 8:6					15	4	2	19	6	90	2,640	1 80	3,860 00	
Dunham, R. G.	1	1	35	1	1	1	3:6	1200	2,000 00			50	30	10	60	40	75	25,000	1 82	38,000 00	
Dunlap Coal Co.							3:4	10	20 00		3	8			8		1 00	240	1 80	388 00	
England, Wm.	1	1					3:4	30	67 50		6	2	2	7	13	2	75	800	1 25	1,000 00	
Evans, C. W.							4:6				2	2	2	4	4	2		1 200	1 25	1,500 00	
Gernhart, Theodore							1:2				15	10	3	1	17	11		50	2 00	1,000 00	
Gibbs, Henry							3:9	180	333 00		15	10	3	1	13	9	85	4,580	1 60	7,828 00	
Hayward & Eaton	1	1	47	1	1	1	3:9	75	140 00		10	6	3	3	17	9	1 00	2,000	1 62 5	3,250 00	
Hobbs, H. B.							2:10	120	240 00		15	8	4	15	8	15	85	4,000	1 25	500 00	
Humbrecht, Chas	1	1	33	1	1	1	2:6	107	197 85		15	8	4	1	18	7		4,000	1 80	6,000 00	
Hurst, J. W.							2:6	1100	2100 00	5	6	60	40	25	85	60	75	2,688	1 62 5	4,364 75	
Kay Coal Co.					14	1	2:10	2	5 00		1	1	3	1	1	4		28,282	2 00	42,423 00	
Kelth & Perry Coal Co	1	1	60	1	1	1	3:10	2	5 00	1	1	1	3	1	1	4		61	1 80	1,220 00	
Keller, J. H.							3:6	33	98 05	1	1	14	8	1	15	9	80	200	1 60	300 00	
Kinney, J. B.							3:6	60	135 00		1	2	2	2	2	2	75	1,063	1 62 5	1,732 25	
Legg, J. P.							2:8	25	53 25	1	1	8	2	1	9	2	1 25	893	1 75	1,652 00	
McFadden & Co.							3:8	10	25 00		16	7	6	6	21	13	85	132	1 25	1,652 00	
McFadden, H. F.	1	1	25	1	1	1	3:8	10	25 00		16	7	6	6	21	13	85	2,060	1 25	2,500 00	
Munday, H. F.							3:8	25	53 25		16	7	6	6	21	13	85	1,000	2 00	1,000 00	
Otto, William							3:8	25	53 25	1	1	8	2	1	9	2	1 25	60	1 50	900 00	
Owen, B. L.							3:8	10	25 00		2	2	1	7	6	2	60	1 50	900 00		
Phillips, Dr. E. S.							3:8	10	25 00		2	2	1	7	6	2	60	1 50	900 00		
Pigg, D. B., Coal Co.		1				1	3:8	25	62 50	1	1	3	1	7	6	2	1 00	1,200	1 25	1,500 00	
Price, B.							3:8	10	25 00		1	3	1	10	4	2	880	1 75	1,540 00		
Rhodes, John							3:8	10	25 00		1	3	1	10	4	2	880	1 75	1,540 00		
Rivier, W. G.			40	1	1	1	2:9	25	62 50	1	1	3	1	10	4	2	880	1 75	1,540 00		
Rusk, Wm.			35	1	1	1	3:8	10	25 00	2	1	30	30	10	10	40	85	15,000	1 40	21,000 00	
Telo Coal Co.			50		1	1	3:8	800	1520 00		60	30	10	6	70	86	85	15,800	1 50	28,000 00	
Thompson, John & Co	1	1			10		3:8	3	6 75		2	1	3	2	1	1	80	1 75	140 00		
Treat, Henry							1:2				1	1	1	3	2	1	60	200	2 00	200 00	
Tyree, Joseph							1:2				1	1	1	3	2	1	60	200	2 00	200 00	
Wells, T. J.	1	1	35	1	1	1	1:2	12	24 00		1	1	1	3	2	1	60	200	2 00	200 00	

[illegible]

JOHNSON COUNTY.

[illegible]

CHARACTER, TONNAGE AND VALUE—Continued.

LAFAYETTE COUNTY.

Name of person or company operating mine.	Kind of power opening.	Kind of opening.		Depth of shaft—feet.	Kind of ventilation.	Diameter of fan.	Mode of working.	Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.		Employees.				Av. price per ton for mining.		Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.			
		Strip-pit.	Drift.								Slope.	Shaft.	Horse.	Steam.	Miners.	Others.	Total.	Winter.				Summer.	Winter.	Summer.
Bell, W. H.							1	1-8											400	\$2.00	\$800.00			
Bell & Greer								1-10											4,000	1.70	6,800.00			
Bonanza Coal Mine								1-8											6,400	1.75	11,200.00			
Bruce & Knoble								1-4											6,000	2.00	12,000.00			
Carter, Andrew								1-8											300	2.00	600.00			
Clark, Thomas.								1-10											1,200	1.50	1,800.00			
Candler Coal & Coke Co.								1-6											30,000	1.53	46,875.00			
Crumpley, E. P.								1-6											240	2.00	480.00			
DeBolt, J. H.								1-6											220	1.75	385.00			
Dover Coal Co.								1-6											6,000	1.25	7,500.00			
Excelsior Coal and Coke Co.								1-5											15,000	1.90	28,500.00			
Farmers' Coal and Mining Co.								1-6											6,530	2.00	13,060.00			
Fox, N. F.								1-6											550	2.00	1,120.00			
Francisco Coal Co.								1-6	150	840.00									3,000	1.25	3,750.00			
Gunn & Co.								1-4											2,080	1.87	3,900.00			
Haygood Coal Co.								1-5											3,000	1.77	5,250.00			
Hartman, Chas. H.								1-8											3,000	1.75	5,250.00			
Hoffman, E.								1-6											60	1.25	75.00			
Kelley Coal Co.								1-6											1,400	2.00	2,800.00			
Keist, Joseph.								1-8											1,680	1.62	2,730.00			
Krampt, Robert.								1-7											300	1.75	525.00			
Krease, A. F.								1-10											875	2.00	1,750.00			
Lafayette Coal Co.								2-2											16,980	1.50	25,470.00			
Leftman, Frederick								1-8											100	1.75	175.00			
Lexington Coal and Mining Co.—																								
McDowell shaft.								2.											68,591	1.25	85,738.75			
Riverton No. 1.								2.											93,911	1.25	117,388.75			
Riverton No. 2.								2.											47,481	1.25	59,351.25			
Hackett mine.								1-9											65,491	1.00	65,491.00			
Grady mine.								1-8											50,541	1.00	50,541.00			
McGrew, J. C.								1-6											24,421	1.25	30,526.25			
Macey, Henry								1-11											56,551	1.00	56,551.00			
Mayview Coal Co.								1-5											66,531	1.25	83,163.75			
Mason River Coal and Mining Co.								1-8											83,171	1.25	103,963.75			
Morrison Bros.								1-10											8,344	1.25	10,430.00			

CHARACTER, TONNAGE AND VALUE—Continued.

PUTNAM COUNTY.

Name of person or company operating mine.	Kind of power.	Kind of opening.	Depth of shaft—feet.	Kind of ventilation.		Diameter of fan.	Mode of working.		Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.		Employees.				Av. price per ton for mining.		Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.
				Furnace.	Fan.		Long-wall.	Pillar and room.				Winter.	Summer.	Winter.	Others.	Total.	Winter.	Summer.				
Adkins, William.	1	1	27					1	2.8				9	1	9	1	85	75	650	\$1.40	\$910.00	
Arnold & Tippet.	1	1	25					1	2.8				8	2	8	2	30	80	1,000	1.10	1,500.00	
Blackbird Coal Co.	1	1	53	1				1	2.8	8	\$7.50	2	1	57	19	10	3	67	23	11,894	1.40	16,632.00
Mendota Coal and Mining Co.	1	1		1				1	2.10			13	11	200	180	80	70	280	88	120,854	1.28	162,710.20
Pharigo, Martin.		1						1	3					2	2			10	8	58	1.00	86.00
Smith, Joseph.	1	1	37					1	3					10	8			10	86	500	1.23	625.00
Totals.	2	3	4	1				6		3	7.50	15	12	236	205	90	73	376	278	134,984	1.27	172,483.20

PETTIS COUNTY.

Brooks & Sba.	1	1				1	1.8				1		1	1	\$1.25	15	\$2.50	\$37.50
Dummond, R. J.	1	1	35			1	2.6	2	4.50		3	1	4	4	1.25	150	2.50	375.00
Seaman, Thomas	1	1	23				2.8	4	10.00		2	1	3	2		68	2.50	170.00
Thatcher, P. A.	1	1									2	2				200	1.75	350.00
Totals.	2	2	1			2		6	14.50		7	6	1	8		433	2.15	932.50

RAILS COUNTY.

Boulware, E. S.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021	1022	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032	1033	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043	1044	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054	1055	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065	1066	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076	1077	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087	1088	1089	1090	1091	1092	1093	1094	1095	1096	1097	1098	1099	1100	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110	1111	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121	1122	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132	1133	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143	1144	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221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CHARACTER, TONNAGE AND VALUE—Continued.

RAY COUNTY.

Name of person or company operating mine.	Kind of power.	Kind of opening.	Diameter depth of shaft—feet.	Kind of ventilation.	Diameter of fan.	Mode of working.	Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.	Employees.				Av. price per ton for mining.		Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.			
											Miners.	Others.	Total.		Summer.	Winter.						
																				Summer.	Winter.	
Bissell Coal Co.	1	1	65	1	1	1	2				26	10	36	171	1.00	1.00	8,020	1.70	\$6,184.00			
Black Diamond Coal Co.			78	1	1	1	2				10	5	15	71	1.00	1.00	1,050	2.00	2,100.00			
Boyard Brown Coal Co.	1	1	45	1	1	1	2.2				56	20	76	241	1.00	1.00	10,508	1.50	15,764.50			
Buckinger, Fred.		1		1	1	1	1.8				3	1	4	1	1.50	1.50	487	2.00	974.00			
Buckler, Mandy	1	1	95	1	1	1	2			1	56	5	61	1	1.00	1.00	14,560	1.75	25,476.25			
Darneal Coal Co.	1	1	108	1	1	1	1.8				10	1	11	4	1.25	1.25	820	2.00	1,640.00			
Dickinson, H. A. & Son	1	1	59	1	1	1	2				10	5	15	1	1.40	1.40	1,000	1.75	1,750.00			
Douglas & More	1	1		1	1	1	1.0				70	10	80	1	1.00	1.00	12,000	1.50	18,000.00			
Hartwell, Arnold & Co.	1	1	35	1	1	1	1.5			2	100	60	10	6	1.00	1.00	20,000	1.50	30,000.00			
Hensley, William	1	1	110	1	1	1	2.4				8	10	18	112	1.00	1.00	24,421	2.25	54,943.25			
Hubbell Mining Co.	1	1	112	1	1	1	1.6				2	10	12	2	1.00	1.00	34,827	1.52	52,428.27			
Hubbell, Hyatt & Hubbell	1	1	75	1	1	1	1.7			8	7	108	87	41	25	144	112	1.00	1.00	82,432.87		
Huston, Joseph	1	1	65	1	1	1	1.7				2	2	2	1	1.12	1.12	1,000	2.00	2,000.00			
Kansas & Texas Coal Co.	1	1	107	1	1	1	1.8				8	2	1	1	1.12	1.12	1,000	2.00	2,000.00			
McCorkendale, John	1	1	50	1	1	1	1.0				88	24	7	6	1.12	1.12	1,000	2.00	2,000.00			
Murray & James	1	1	50	1	1	1	1.0				84	17	5	41	221	1.00	1.00	10,154	1.54	15,628.27		
Phillips' Bank	1	1	107	1	1	1	1.0				76	75	12	10	57	83	1.00	1.00	6,185	1.50	9,277.50	
Pickering, Joseph	1	1	50	1	1	1	1.0				40	6	46	1	1.00	1.00	154,941	1.54	238,670.10			
Rankin, W. D.	1	1	50	1	1	1	1.0				8	100	75	16	12	116	87	1.00	1.00	1,000	2.00	2,000.00
Richmond Coal Co. No. 1	1	1	50	1	1	1	1.0				3	110	90	16	14	128	104	1.00	1.00	400	2.00	800.00
" " " " " "	1	1	50	1	1	1	1.0				3	110	90	16	14	128	104	1.00	1.00	885	2.00	1,770.00
" " " " " "	1	1	75	1	1	1	1.0				3	80	12	8	82	68	1.00	1.00	600	2.00	1,200.00	
" " " " " "	1	1	75	1	1	1	1.0				40	6	46	1	1.00	1.00	60	1.50	90.00	1.50	225.00	
" " " " " "	1	1	153	1	1	1	1.1				4	1	2	4	11	37.5	1.00	1.00	400	2.00	800.00	
Sater, W. H. & Co.	1	1	35	1	1	1	1.6				2	1	3	1	1.25	1.25	60	1.50	90.00	1.50	135.00	
Sevens, W. W.	1	1		1	1	1	1.6				2	1	3	1	1.25	1.25	60	1.50	90.00	1.50	135.00	
Stiles, William	1	1		1	1	1	1.6				1	1	1	1	1.00	1.00	60	1.50	90.00	1.50	135.00	
Williams Coal Co.	1	1		1	1	1	1.6				1	1	1	1	1.00	1.00	60	1.50	90.00	1.50	135.00	
Totals	18	9	21	1	7	28	1	20	40.00	23	97,529	185	99	1162	628			272,948	1.54	421,631.61		

CHARACTER, TONNAGE AND VALUE—Continued.

SULLIVAN COUNTY.

Name of person or company operating mine.	Kind of power.	Kind of opening.	Depth of shaft—feet.	Kind of ventilation.		Diameter of fan.	Mode of working.		Average thickness of vein.	No. of kegs powder used during year.	Cost of powder for the year.	Mules.		Employees.				Av. price per ton for mining.	Total number of tons mined.	Average value per ton at mine.	Amount received for the total output of the year.		
				Furnace..	Fan.....		Long-wall	Pillar and room				working...	Summer	Winter	Miners.	Others.	Total.					Summer..	Winter
Keat Coal Co.		1	190				1		3	50	112 50		5	2	7	1 00	800	\$1 50	\$1,200 00				
Milan Land and Coal Mining Co.	1	1					1		3 6	50	112 50		35	4	39	80	8000	1 55	12,400 00				
Totals.....	1	1					1			50	113 50		40	6	46		8800	1 54	13,600 00				

ST. CLAIR COUNTY.

Alexander, J. W.							1 4				3	2	5	1 50		85	\$2 50	\$212 50
Browning, W. G.						1 1	1 9				3	3	6			150	2 00	300 00
Cook, Hiram						1 1	1 8				2	2	4			100	1 75	175 00
Douthat, D. T.			20			1 1	2 8			1	16	3	19	85		2800	1 95	5070 00
Johnson, J. M.						1 1	2 8				1	1	2			80	1 50	120 00
Merryfield, S. O.						1 1	3 8	8	10 00		1	1	2			80	1 50	120 00
Reed Bank.						1 1	2 6				2	4	6			160	1 50	240 00
Seymour, W. A.						1 1	2 6				6	3	9	1 00		500	1 50	750 00
Vannice, G. A.						1 1	2 7				10	3	13	75		450	1 50	675 00
Watkins, William						1 1	2 7				2	2	4			400	1 35	500 00
Whitaker, J. W.			24			1 1	2 8				2	1	3			100	1 50	150 00
Wilson, E. B.						1 1	3 8				4	1	5	75		700	1 50	1050 00
Totals								8	10 00	1	50	14	63			5405	2 73	9992 50

VERNON COUNTY.

[illegible]

TABLE VIII—SHOWING COAL PRODUCT BY COUNTIES,

According to tonnage, with price per ton, and amount received for the output, together with the number of large and small mines in each.

Counties.	Product in tons 1892...	Average price per ton.....	Am't rec'd for output of 1892.....	Employ 10 or more men....	Employ less than 10 men.
Macon	685,335	\$1 04	\$717,173 02	19	15
Bates	659,924	1 06	699,927 35	24	28
Lafayette	347,600	1 53	536,092 95	31	20
Randolph	297,011	1 27	379,232 08	9	16
Ray	272,948	1 54	421,631 61	17	12
Henry	137,258	1 45	199,735 00	16	21
Putnam	134,934	1 27	172,483 20	3	3
Vernon	119,036	1 08	129,126 17	6	27
Barton	108,784	1 18	128,869 50	4	28
Caldwell	38,333	1 98	76,097 16	4	.....
Linn	35,588	1 58	56,214 96	4	3
Andrain	29,792	1 68	50,164 85	2	8
Grundy	28,670	2 40	68,983 00	2	.....
Boone	21,058	1 54	32,590 25	4	10
Callaway	16,551	1 58	26,179 35	2	8
Montgomery	16,039	1 35	21,706 65	1	1
Adair	14,820	1 65	24,365 00	2	5
Johnson	10,485	1 76	18,441 42	4	11
Sullivan	8,800	1 54	13,600 00	1	1
Dade	6,881	1 53	10,520 00	2	6
St. Clair	5,405	1 73	9,362 50	3	9
Saline	4,440	1 99	8,873 25	1	10
Cedar	4,181	1 48	6,230 00	.....	8
Cooper	3,666	1 95	7,152 80	1	4
Chariton	2,312	1 94	4,503 00	.....	14
Nodaway	1,850	2 55	4,720 00	3	4
Cole	1,548	2 00	3,096 00	.....	2
Carroll	1,380	2 76	3,810 00	.....	5
Livingston	1,000	2 25	2,250 00	.....	1
Schuyler	766	1 25	957 50	.....	3
Pettis	433	2 15	932 50	.....	4
Ralls	280	1 75	490 00	.....	1
Miller	127	2 50	317 50	.....	1
Totals	3,017,285	1 26	3,825,828 57	165	289

TABLE IX.—COMPARATIVE TABLE OF TONNAGE AND VALUE OF OUTPUT OF COAL MINES OF MISSOURI 1889 TO 1892.

Counties.	Number of tons of coal mined.				Amount received at the mines for the output.			
	1889.	1890.	1891.	1892.	1889.	1890.	1891.	1892.
Adair.....	16,532	14,840	17,110	14,820	\$27,980	\$24,379	\$28,511 25	\$24,365 00
Audrain.....	22,298	22,813	19,569	29,792	36,497	30,117	30,038 97	50,164 85
Barton.....	122,663	65,097	63,626	108,784	153,542	83,818	92,179 94	128,869 50
Bates.....	739,633	671,373	726,273	659,924	755,278	713,039	763,740 88	699,927 35
Boone.....	9,944	21,302	23,577	21,058	14,916	31,173	34,574 50	32,590 25
Caldwell.....	26,074	17,074	22,661	38,333	54,571	34,660	40,874 00	76,097 16
Callaway.....	12,633	18,355	15,581	16,551	19,677	30,517	24,977 03	26,179 35
Carroll.....	.....	.....	.....	1,380	.....	.....	.....	3,810 00
Cedar.....	.....	.....	1,264	4,181	.....	.....	1,666 00	6,230 00
Chariton.....	.....	120	1,170	2,312	.....	240	2,340 00	4,503 00
Clay.....	.....	5,036	8,289	.....	.....	7,554	14,920 20	.....
Cole.....	.....	.....	2,000	1,548	.....	.....	3,040 00	3,096 00
Cooper.....	1,027	1,594	2,200	3,666	1,640	3,511	4,400 00	7,152 80
Dade.....	2,290	1,400	3,402	6,881	3,907	1,960	5,718 50	10,520 00
Grundy.....	18,000	23,593	28,983	28,670	35,000	48,366	53,300 00	68,983 00
Henry.....	210,376	127,281	144,139	137,258	217,694	193,231	211,834 01	199,735 00
Howard.....	.....	4,000	.....	.....	.....	5,600	.....	.....
Jasper.....	.....	.....	633	.....	.....	.....	.....	.....
Johnson.....	12,803	13,187	10,539	10,485	21,713	21,113	17,100 50	18,441 42
Lafayette.....	320,448	329,845	352,603	347,600	536,997	508,743	545,551 17	536,092 95
Linn.....	2,136	13,403	28,036	35,588	4,272	21,720	44,630 09	56,214 96
Livingston.....	.....	1,100	200	1,000	.....	2,250	450 00	2,250 00
Macon.....	223,660	457,896	454,029	685,335	309,443	585,925	576,678 51	717,173 02
Miller.....	.....	87	130	127	.....	218	325 00	317 50
Morgan.....	.....	240	488	.....	.....	480	1,064 00	.....
Montgomery.....	10,003	14,744	13,124	16,039	14,769	21,595	17,753 40	21,706 65
Monroe.....	.....	108	36	.....	.....	163	24 00	.....
Nodaway.....	.....	.....	2,222	1,850	.....	.....	5,504 50	4,720 00
Putnam.....	75,877	91,584	123,526	134,984	107,581	116,883	143,554 00	172,483 20
Pettis.....	.....	.....	.....	433	.....	.....	.....	932 50
Ralls.....	.....	675	614	280	.....	1,020	1,151 00	490 00
Randolph.....	184,609	245,898	224,758	297,011	272,244	318,833	266,422 77	379,232 08

VALUE OF OUTPUT—Continued.

Counties.	Number of tons of coal mined.				Amount received at the mines for the output.			
	1889.	1890.	1891.	1892.	1889.	1890.	1891.	1892.
Ray.....	207,829	240,462	282,247	272,948	\$324,740	\$387,346	\$446,860 41	\$421,631 61
Saline.....	832	660	7,981	4,440	1,872	1,265	14,664 00	8,873 25
Schuyler.....	.....	300	280	768	.....	375	450 00	957 50
Shelby.....	.....	40	8	.....	.....	80	16 00	.....
Sullivan.....	.....	.....	560	8,800	.....	.....	1,120 00	13,600 00
St. Clair.....	.....	.....	3,866	5,405	.....	.....	5,989 50	9,362 50
Vernon.....	13,313	33,292	64,303	119,036	14,841	38,188	79,540 20	129,126 17
Totals.....	2,223,477	2,437,399	2,650,018	3,017,285	3,030,414	3,234,351	3,480,866 83	3,825,828 67 3,825,828 67

ACCIDENTS IN COAL MINES.

During the past year there have occurred 41 non-fatal and 20 fatal accidents. As compared with the previous year, there has been an increase of two fatal and nine non-fatal ones. For this year, however, there is an increase of 367,267 tons coal mined, with a gain over the preceding year of 3641 more tons mined for each life lost. Reference to the table on coal-mine accidents will show that out of a total of 61 accidents—fatal and non-fatal—40 accidents, or 65½ per cent of all, resulted from falls of roof and coal; five resulting from windy shots, four from explosions, four from cages, four from mine cars, two from flying coal from shots, one from gas, and one from an earth slide in a strip-pit. Macon county has proved to be the most unfortunate in the number of fatal accidents, eight men having been killed from falls of roof and coal. This is due largely, we think, to the character of roof encountered in the mines of this county, and also to the large amount of powder used.

Of the 61 accidents in the coal mines of the State, 77 per cent of employes were miners; 13 per cent were laborers, and 10 per cent shot-firers.

Upon an examination of the fatal accidents it may be noticed from the testimony before, and the verdict of the coroner's jury, that six accidents were due to neglect of the parties themselves; six were pronounced accidental; three are classed as unavoidable; three from windy shots resulting in explosions, and two from too great a delay in properly timbering rooms. While the per centage of accidents from falls of roof and coal appears large, yet it is about on a par with the country at large.

RECAPITULATION OF COAL-MINE ACCIDENTS.

Number of non-fatal accidents.....	41	61
Number of fatal accidents.....	20	
Total number of accidents.....	61	
Number of single men killed.....	7	20
Number of married men killed.....	13	
Total number men killed.....	20	
Number of wives made widows.....	13	20
Number of children made fatherless.....	46	
Number of men insured.....	1	
Amount of insurance.....	\$2,000	

Cause of Accidents and Number Injured.

From falls of roof.....	31	61
From falls of coal.....	9	
From flames of windy shots.....	5	
From explosions.....	4	
From cages.....	4	
From mine cars.....	4	
From flying coal from shots fired.....	2	
From being burned with gas.....	1	
From earth slide in strip-pit.....	1	
Total.....	61	

How the Injured Men were Employed.

Miners.....	47	61
Shot-firers.....	6	
Laborers.....	4	
Drivers.....	2	
Mine-boss.....	1	
Cager.....	1	
Total.....	61	

MINE EXPLOSIONS.

A little before 9 o'clock on the night of December 29, 1891, a serious explosion occurred in mine No. 7, located about three miles south of Rich Hill, and owned and operated by the Keith & Perry Coal Co., a corporation owning a number of mines in Southeastern Kansas and Southwestern Missouri, with general office at Kansas City, Mo. This explosion resulted in the death of Lincoln White and Robert Brown (both colored), the two shot-firers, besides killing eight mules which were in the mine at the time, and doing a great deal of damage to the property.

This is the third explosion which has occurred in this mine during the past year. The first explosion took place on the night of October 7, and resulted in the death of W. R. Metz and serious injury to Amos Alger, who were employed to fire shots, besides killing eight mules and completely wrecking the hoisting shaft. After making a careful examination of the mine, I made a special report to the Labor Commissioner, in which I stated that in my opinion the disaster was caused by the firing of several heavy shots in quick succession in the rooms on first and second west entry, on north side of shaft, one or more of which were windy, or what the miners term "cyclone" shots, the fire from which ignited the powder contained in a box near the mouth of one of these rooms. This carried the fire to other powder which was contained in boxes in an east entry near shaft-bottom, which in turn exploded five or six kegs contained in boxes situated in a cross-cut connecting the mule stable with the first east entry on south side of shaft. (Mr. Sweeney, sup't, has since informed me that the company gave 10 kegs of powder to miners whose powder was lost in the explosion.) I furthermore stated that I had no doubt but that the fine coal-dust suspended in the air, which had been set in motion by the firing of previous shots, played quite an important part in the disaster by adding fuel to the flames.

In order to guard against a repetition of this accident in the future, I recommended that each miner be prohibited from taking any more powder into the mine than was absolutely necessary for present use, and that a sufficient interval between the firing of each shot be given, in order to allow the dust raised by the previous shots to subside or be carried away by the ventilating current. The recommendation as to the amount of powder each miner should be allowed to take into the mine was strictly enforced, according to the sworn statement of

several witnesses; but it seems from the evidence produced that a sufficient interval was not allowed by the shot-firers between the firing of each shot, as should have been done had our instructions been complied with.

The second explosion was a slight one. It occurred on October 22, while the shots were being fired, and blew out a part of the brattice-work between hoisting shaft and ventilating chamber, but doing no further harm. Probably the most violent explosion that ever occurred in the mines of Missouri was the one which took place December 29. The effect of it was perceptible for some distance around—people in Rich Hill, three miles away, claiming to have felt it. The west cage which was standing on the bottom, was shot up through the top of tip-house, a distance of 180 feet, breaking the 12×12-inch timbers which supported the sheave-wheel, and blowing a part of the sheave, together with a part of one of the timbers, over the top of the engine-house, while other timbers were blown in all directions, one large piece falling through the roof of the engine-house. The cage was found lying against the slate-dump completely wrecked. These cages are made of heavy oak timber and iron, and are estimated to weigh not less than 2,500 pounds each. An escapement shaft had just been sunk, located about 700 feet southeast of hoisting shaft, and equipped with a good stairway consisting of 27 flights of stairs made of two-inch lumber, and spiked with 20 penny nails. The force of the explosion blew every piece of the stair-case out and scattered it about over the prairie. These facts are sufficient to show the terrific force of the explosion.

Immediately after the explosion occurred, the people flocked to the shaft and a rescuing party was lowered into the mine, but it was found the mine was on fire, and the flames were making such progress that the rescuing party had to be withdrawn, and the mine sealed up in order to extinguish the fire.

I arrived at the mine on the morning of the 31st inst. thirty-six hours after the explosion, and found John Perry, general manager, David Mackie, general sup't, and Pat Harding, mine-boss, and a number of miners opening up the escapement shaft, preparatory to entering the mine. After the covering had been removed from the escapement and hoisting shaft, a strong wind which was blowing from the south sent a fair current of air through the mine, this being accomplished by erecting a sail cloth on north side of shaft. As soon as ventilation had been sufficiently restored, Pat Harding, mine-boss, William Brun, myself, and a miner whose name I cannot recall, entered the mine by being lowered down the escapement shaft in a tub. We followed the air-current down the third east entry to the main south

entry, and along the south in the direction of the bottom of hoisting shaft, until we arrived at the mouth of the first and second west entries. Here we encountered such quantities of black damp (C. O.²), that we could not go any further, so we returned to fresh air and waited nearly an hour before the foul air was sufficiently removed to permit us to move on to the bottom.

On our return, and after reaching the roadway leading to the mule stable, we found the fire still burning in the stable and throwing off large volumes of smoke. As soon as possible, a rubber hose was let down the shaft, and a stream of water turned on the fire. In the meantime we put up a brattice-cloth across the main entry to force the air current through the stable, so as to carry the smoke and foul gases away. A continuous stream of water played upon the fire until about 4 o'clock in the afternoon, when, discovering that the coal north of the mule stable was also on fire, it was decided to withdraw the men and again seal up the mine.

Monday, the 4th of January, the mine was again opened and the fan started. This time the men entered the mine at the hoisting shaft, carrying the air by bratticing between the hoisting shaft and ventilating chamber. The sealing up of the mine had not entirely extinguished the fire, so a stream of water was again turned on and the fire was finally put out. On the following day about 1 o'clock, we found the body of Robert Brown, half buried beneath a fall of slate. He was found about 15 feet north of second west entry, lying on his face with his head toward the north, doubtless in the same position he was left in after the explosion. While the burns on his body did not seem sufficient to cause immediate death, the after-damp, which is always found in mines after an explosion, rendered him unconscious in a few seconds, from which cause he probably died.

Lincoln White's body was found at 5 o'clock on main entry, and about 48 feet north of second west entry. He was also lying on his face, but with his head toward the bottom of the shaft, two or three feet of slate having fallen upon him. Neither did he seem to have been burned sufficiently to cause death.

On the following day we made a careful examination of the mine, in which we were kindly assisted by Prof. Arthur Winslow, State Geologist of Missouri, and John T. Stewart, Mine Inspector of Kansas, being also accompanied by the following officers of the Keith & Perry Coal Company: John Perry, general manager; G. R. Sweeney, superintendent; John Mackie, general superintendent; and Pat Harding, mineboss. We entered the mine at the main hoisting shaft, and followed the main north entry up to the second west entry, and up the west

to the head. Here we found evidence of shots having been fired in the mouth of a room which was being turned by Stephen Winkle. We were undecided at the time whether one or two shots had been fired, but according to the sworn statement of Mr. Winkle, which I afterward took, there were two shots fired, one five and the other six feet in depth. These shots had the appearance of having been over-charged and capable of throwing off a large flame. We also found that two shots had been fired in the second room east of Mr. Winkle's room, both of which seemed to have been over-charged, judging from the distance fragments of coal were blown. (See accompanying drawing.)

The shot-hole on the right hand side of the room had been drilled about five or six feet deep on solid at point of hole, as shown by two feet of shot-hole which was left standing, and the one on left of room was also a very heavy shot, having been drilled about $6\frac{1}{2}$ feet on solid. About three feet of hole was left standing.

In our opinion, either of these shots, owing to their location, was liable to throw off large volumes of flame, resulting in what the miners term a "windy" or "cyclone" shot. The four shots described above were, in our opinion, the last fired in the mine, one or more of which caused the explosion, as the shots in the adjoining rooms were standing ready tamped but unfired. The fact that all shots had been fired in back or first west entry, on the return air-course is evidence that these four shots were the last fired, as we would naturally suppose that the the shot-firers would commence firing on the last of the air nearest the up-cast, and fire in reverse order to the air-current, in order that the powder-smoke might be carried away by the ventilating current. We continued our examination to all parts of the mine in which fire-damp was suspected to exist, but no trace of it was found that could be detected with an open light.

There was but little charred coal or coke observed along the roadways. However, the standing timbers along the same were covered with soot, and a deposit of the same, nearly one-half inch thick, was found upon the floor of the tip-house.

Ventilation was being produced by a 10-foot ventilating fan which sets in the up-cast air-way at the shaft-landing,* and is designed to run up to 150 revolutions, furnishing about 40,000 cubic feet of air per minute.

The coal is brought to the surface through a main vertical hoisting shaft 130 feet deep, divided by partitions into cage-ways. The up-cast or ventilating shaft is bratticed off from the main hoisting shaft by

*Since explosion a 14-foot ventilating fan has been erected at the escapement shaft, which is now being used to ventilate the mine.

wooden brattice-work, and has an area of about 28 square feet, with wooden chimney extending 36 feet above the landing. The air was being carried down the main hoisting shaft. At the bottom it was divided into two parts, one passing to the south and the other to the north. There was also sufficient air being taken in at the escapement shaft to ventilate a portion of that part of the mine.

The air-current passing to the north was carried to the head of main north entry, returning through the air-course to the second west entry, thence up the west entry and around through the workings, and returning through the first west or back entry to the return air-course, thence to the up-cast shaft. Prior to this we had made a careful examination of the mine on the 12th of October, and found 23,160 cubic feet of air passing as shown by the air-meter, measurements being taken on the return air-course near the up-cast shaft.

The accompanying drawing shows the method of working and ventilating the mine at the time of the explosion. The large arrows show the direction of air-current and the small ones the direction the explosion traveled. It will also be seen that in some instances the small arrows are pointing through the stoppings between entries, this being done in order to show the direction that stoppings were blown. It will also be observed that most of the stoppings were blown from the return air-course and first west or back entry into the main north and second west entries, notwithstanding the explosion having originated in the second west. This may be attributed to the fact that the return air-course leading to the first west or back entry contained a large amount of fine, dry coal-dust, due perhaps to not having been sprinkled, there being no communicating track to convey the water-car through the same.

There is more powder used in getting the coal, not only in No. 7 but in most of the mines in the vicinity of Rich Hill, than used in any other mine in the State. The books of the company show that during the month of December, 445 kegs of powder were used in producing 7810 tons of coal, or only about 17.5 tons for each keg used. When we consider the great amount of powder used in producing such a comparatively small amount of coal, we are led to believe that it is handled in a very reckless manner, and windy or cyclone shots are to be expected.

Some of the witnesses testified that they use as much as 10 or 12½ pounds of powder each day. The officials of the company are to be commended for restricting the amount of powder taken into the mine by each miner to 12½ pounds, and for requiring them to carry the same in a closed vessel. Since the explosion, this company has caused pipes

to be laid leading from the pump at the bottom of shaft along the return air-course to the first west entry, through which water is forced and used to thoroughly wet, not only the entries, but the rooms as well. A 14-foot ventilating fan has also been erected at the escape-shaft to take the place of the 10-foot fan, since which time no windy or cyclone shots have been reported to us as having occurred.

In our report on the first explosion, which occurred October 7, we did not hesitate to state that in our opinion the gun-powder played the greatest part. But as there was no powder in the mine at the time of this disaster, except that which was in the shots, we are compelled to look for the cause elsewhere; nor can we charge it to fire-damp, as all the evidence goes to show that no fire-damp existed in the mine—that is, not in sufficient quantities to detect with an open light—but it must be remembered that less than two or three per cent of fire damp (C. H.⁴) cannot be detected with an ordinary safety-lamp. In other words, after a thorough examination of a mine is made, and reported entirely free from gas, there may yet be from two to three per cent in the air; but this small per cent of gas, even if it existed, could do no harm within itself. It does seem to us that this presents good reasons for further considering the coal-dust theory, and to demonstrate that fine inflammable coal-dust really plays quite an important part in many coal-mine explosions.

As early as the commencement of the Nineteenth century, coal-dust in collieries was considered an element of danger by a few scientists in Europe; but the first series of practical observations of the action of coal-dust in explosions was made by Messrs. Faraday and Lyell at the Haswell colliery, England, in September, 1844, after a disastrous explosion had occurred, in which they arrived at the conclusion that coal-dust may be instrumental in greatly extending and increasing the disastrous effect of explosions in coal mines.*

More recently a systematic series of experiments upon a very extensive scale has been carried out in Germany, by the Prussian fire-damp commission, and the results obtained have furnished conclusive evidence of the possibility of certain kinds of coal-dust being the sole inflammable agent instrumental in the production of coal-mine explosions. It is also the opinion of scientists of Europe who have given attention to mine explosions in which coal-dust was believed to be a factor, that explosions occurring as they do more frequently in winter than in summer months, give, as a cause for the same, the fact that cold air passing into the mine in winter is thus made warm and therefore absorbs moisture from the road-ways, leaving the fine coal-dust

*See *Mine Accidents and their Prevention*, by Sir Frederick Abel, pages 55 and 56.

along the same in a very dry condition ; whereas in summer months the warm air passing into the mine cools and precipitates its moisture, which has a tendency to dampen the roadways.

When our attention is called to the fact that all the most disastrous explosions which have occurred in Missouri, Kansas and Indian Territory, in which coal-dust is thought to have been a factor,* have taken place during the winter months, and while the shots were being fired, gives in our opinion, great weight to the theory above advanced. The principal explosions in this section of the country of recent date occurred as follows :

Western Coal & Mining Co., Fleming, Kansas, Dec. 17, 1887.

Keith & Perry Coal Co., Rich Hill, Mo., March 29, 1888.

Cherokee & Pittsburg Coal & Mining Co., Frontenac, Kansas., Nov. 9, 1888.

Keith & Perry Coal Co. (Mine No. 7), Rich Hill, Mo. Oct. 7, 1891.

Keith & Perry Coal Co. (Mine No. 7), Rich Hill, Mo., Dec. 29, 1891.

Osage Coal & Mining Co., McAllister, Ind. Ter. Jan. 7, 1892.

The above named explosions, all occurring in the winter season, goes far to show that the conditions are not the same in our mines at all times of the year. If they were, it appears to us that explosions would be as likely to occur in summer as in winter.

The evidence taken before both the coroner and myself relative to the explosion at mine No. 7, goes to show that the mine was in good condition, well ventilated and free from fire-damp, prior to and subsequent to the explosion. The fact that no old, abandoned workings existed in the mine where the fire-damp could collect, and that all the miners and other workmen used open lights, is evidence that fire-damp was not the prime cause of the disaster.

This may be considered a dry mine, as but little water is found in it except that which collects at shaft-bottom and at head of main north entry. Roadways are dry and dusty unless kept sprinkled, but according to the sworn statement of Frank Sample, all the roadways in the mine were sprinkled on Sunday (two days before the explosion), except the air-shaft entry, while other witnesses testified that some of the roadways were in a damp condition. The sides and roofs of roadways were not sprinkled, which in our opinion is of as much importance to keep dampened as the floor, as the finest and most inflammable coal-dust is most likely to be found on timbers and projecting shelves along

*It is the opinion of some mine managers and miners, that coal-dust played but little, if any part in some of the explosions referred to ; but as not sufficient fire-damp seemed to exist in either of them to cause an explosion within itself, we would naturally suppose that they were assisted by some other agent. Large quantities of powder were being used in the mines at the time, and all the explosions occurred while shots were being fired.

the same. However, this is a precaution not practiced in this State, but is considered of much importance by mining men in other parts of the country.

Having been unable to secure an analysis of the coal in mine No. 7, we submit herewith the analysis made by Prof. William B. Potter of St. Louis, of the coal taken from Keith & Perry Coal Co.'s mine No. 6, after the explosion in 1888. Mine No. 6 is also located near Rich Hill, Mo., and the coal is of the same general character as that in mine No. 7. A few remarks on the subject by Prof. Potter are also submitted:

In order to obtain some knowledge of the combustibles involved in the case under consideration, I have had analyses made in the laboratory of the St. Louis Sampling and Testing works, of average samples of the lump, nut and pea coal produced at Mine No. 6; also of the dust taken from the floor of the entry in which the three heavy shots were fired previous to the explosion. Analyses were made of the dust as taken from the floor, and of that portion of it passing a 40-mesh screen. The proportion of the latter to the whole sample was $23\frac{1}{2}$ per cent.

	Lump....	Nut.	Pea.....	Ave. dust.	Screens through 40-mesh screen...
Moisture.....	5.05	5.16	4.50	6.00	6.40
Volatile matter.....	34.40	35.48	34.95	33.08	31.44
Fixed carbon.....	44.50	37.24	36.57	34.67	30.75
Ash.....	16.05	22.12	23.98	26.25	31.41
	100.00	100.00	100.00	100.00	100.00

It will be seen from these analyses that the proportion of volatile matter, even in the lump coal, is quite large, while the small coal, and especially the fine dust, which is especially concerned in the explosion, has a larger amount of volatile matter than of fixed carbon, forming nearly one-third of the weight of the whole material, notwithstanding the large increase in the proportion of the incombustible mineral matter or ash. Indeed, such results are to be expected from the nature of the coal. The bright pitch-like layers of the coal are richer in volatile hydrocarbons than the dull black layers alternating with these, and are at the same time much more brittle and likely to yield a larger amount of fine powder when roughly handled.

It will be seen by reference to the testimony of the night fireman, W. H. Van Dusen, that the shot-firers came to the bottom of the shaft about 8 o'clock and notified him that they were going north, and from 15 to 30 minutes afterward came back to the bottom and wanted to be hoisted out, stating that they had fired a bad windy shot which had nearly caught them.

The shot-firers doubtless lighted up and fired all the shots in the first west or back entry on north side together—regardless of the rules or danger—one or more of which were over-charged, causing an elongation of flame, resulting in what is known as a “cyclone” or windy shot.

It is probable that the heavy shot referred to broke down a door or two and otherwise disarranged the ventilating current. This resulted in allowing the gas, generated from the heated coal-dust and also the fire-damp the shots may have liberated, to accumulate.

The shot-firers, returning a half hour later, evidently unaware or paying no attention to the damage which the former shots had done, fired the four shots in second west entry, and these also being over-charged, caused a large flame to pass through the cross-cut into the back or first west entry, and it igniting the gas, liberated and accumulated as above stated, and feeding upon the fine coal-dust suspended in the air, combined with the other agents to cause the disaster.

This fine coal-dust, claimed to be so fruitful in assisting explosions, is doubtless responsible for the same having been carried over such a large portion of the mine. The explosion developed increased power as it traversed the entries, as shown by the effect on the stoppings. Those near where it originated were not molested, while those between air-course and entry near the shaft were blown out, and the steam-pump, located in the air-course near the shaft-bottom, was blown into the sump and broken. The fact that the explosion continued under and across the main shaft and on to the escapement shaft, 700 feet beyond, doing great damage by blowing stairs out of same, is evidence that some additional force was added to the explosion, besides the small per cent of gas which may have been in the mine, and the 12 or 14 pounds of gun-powder which was in the four shot-holes.

If some other agent had not contributed to the explosion as it passed along the entry, it does seem to us that it would have lost force from its starting point instead of gaining power. Now the question arises: What was that other agent?

It certainly was not fire-damp, as there was no perceptible gas in the mine before or after the disaster, as substantiated by the evidence of all the witnesses, and powder could not have been the cause as, there was no loose powder in the mine at the time. After reviewing all the evidence concerning the explosion, together with a personal knowledge of the condition of the mine before and after it occurred, and governed by experience and observation here and elsewhere, and by the experience of others in similar disasters, we do not hesitate to give it as our

judgment that coal-dust played a very important part in this explosion. Indeed, we are so impressed with the correctness of this theory that we would recommend all mine operators and managers to use every possible precaution to guard against the accumulation of fine dry coal-dust along the roadways, especially in mines generating fire-damp, and where gun-powder is used.

We would furthermore suggest that all shot-holes be drilled in such a manner as to take fair advantage of the mass of coal to be blown down, and under no circumstances should a shot be fired that in the opinion of the shot-firers is likely to prove a blown-out shot. Nor should more than one shot be fired in any working place less than 20 feet wide, at any one time, and sufficient interval should be given between the firing of each shot to permit the dust raised and gases that may be liberated by the same to be carried away by the ventilating current.

We submit herewith a letter from Mr. David Mackie, general superintendent Keith & Perry Coal Company, a gentleman who has had large mining experience both in this country and in Europe :

SCAMMON, KANSAS, Jan. 22, 1892.

C. C. WOODSON, Inspector :

DEAR SIR—After a careful examination of the Keith & Perry mine, No. 7, at Rich Hill, and carefully considering all the testimony produced at the coroner's inquest, also that taken by you and Prof. Winslow, I can find nothing in the conditions of the mine or testimony that would justify me to think the mine was not in good condition. The mine, as proven by all the testimony, was well ventilated at all times, and was on the 29th, when the explosion occurred, or at least when the shot-firers went on duty. The mine is comparatively new, and worked on the room-and-pillar plan, with double entries and good large air-ways free of gas, and, as stated by you (on our examination previous to the explosion), in good condition.

On Dec. 29, while the shot-firers were lighting the shots, there was an explosion. The question is, what was the cause of it? I believe it was caused by the shot-firers violating the company's rules and lighting up and firing off the shots in a careless and reckless way—evidently lighting up as many as eleven at one time, having no regard for life or property. This has all been proven by the testimony produced, also that they had seen the fan reversed by the concussion of the shots.

I will now give you my opinion of what I think caused the explosion (as proven by two witnesses). The shot-firers had, on the night of the 29th, about 8 p. m., what is known as a windy shot. This caused a flame of fire to travel over a large portion of the north side of the mine, at the same time deranging the ventilation by breaking the ventilating doors, stoppings, etc., cutting off ventilation from the working faces of rooms.

After shot-firers had been out of the mine about thirty minutes they returned, evidently paying no attention to the damage that had been done to the air-ways or air-currents, but started to fire off the other shots. Owing to the windy shot having caused a disturbance in the mine, at the same time having (while the flame was passing over that part of the mine) burned up some fine coal-dust that was in the air, there was left in the mine carbonic oxide gas. This gas is produced from the

blasting of powder, burning of coal or wood; is easily lighted and an explosive when mixed with two of gas to five of air. So, on the shot-frers' return, when they started to fire, the flame from the shots first fired came in contact with the carbonic oxide gas, which caused the explosion. The expansion of said explosion disturbed and raised more fine coal-dust, which would increase the flame; all of this was caused by the excessive use of powder handled in a reckless way.

I believe that such an explosion can be made where excessive blasting is done. I will here give you what confirms me in believing this. While opening up a new mine, having main entries in about 120 feet from bottom of shaft, 12-feet wide, air-way 6-feet wide, each 4-feet high (this was before having the brushing done), we had two shots drilled in the solid about 4 feet, with $2\frac{1}{2}$ to 3 lbs. of powder in each hole; fired them off with a battery from surface, no one being in the mine; we had a light explosion that burst the plank we had as an up-cast on the air-chamber at the surface. We then fired one shot, the same as the aforesaid, and there was no explosion, but as often as we fired two or more shots, with the battery, had bad results. I may state just here that we had water all over the floor of the entry; there was no coal-dust, only what might be made from the coal when the shots went off; so I cannot see that coal-dust cut much of a figure in this case.

Now what I want to get at is the safest and best way to run our mines, and I am satisfied before we can do that, we must have a law restricting the amount of powder to be used in the mine; also that no hole shall be drilled or fired that in the judgment of the fire-boss has not been properly liberated by cutting or otherwise, so as to give the powder a chance to lift out the coal. If this was done, and not more than one shot to be fired off at one time, I do not think we would have any explosion.

Returning again to the dust question: I cannot think it cuts as much of a figure as claimed by some. For when the shot-frers had the first windy shot which caused them to come out of the mine, which they said was a bad one, yet it did not make the explosion, and as the greater part of the shots had been fired off at that time, it is reasonable to assume that the coal-dust in the mine would be stirred up and in a fit condition to burn (and I believe some of it did), yet there was no explosion such as followed after that.

There must have been some conditions when they returned to the mine that did not exist when the former shots were fired—coal-dust was in the mine before the first windy shot or shots were fired at that time, also after the explosion, so I cannot see that I have any reasonable ground to say that coal-dust cut much, if any, figure in the explosion.

While with you making an examination of the mine, you said that you would have an analysis made of the fine coal-dust; I wish you would have one also made of the powder; I think it is our duty to get all the information we can, and see if we cannot get at some safe way of having coal mined. I do think by using good powder and restricting the amount to be taken in the mine, also that not more than one shot be put off at one time, starting on the return of the air lighting the second shot, after the smoke was carried off, so that no second shot was fired until all smoke was out of that room—if this was done, I have all confidence in saying we would have no explosions.

Since the law was passed in Kansas for shot-frers to be employed to do the firing, while it is one of the best laws ever passed, and one I tried to enforce for the safety of mining before it became a law. Still there is one feature in it that has to be closely watched, and that is the miners drilling their holes too much on the solid, as they know that they have not got said bad shots to fire. So to give the

shot-firers a chance to judge for themselves what shots are unsafe to light, the only way is for the needle hole to be clear, so they run in the needle they have and find the depth of said hole and angle, and fire with squibs.

P. S. I have read this to Mr. Stewart, our State Mine Inspector, and he said it was also his views of what caused the explosion.

Will be glad to hear from you, and have your opinion also as we want to get as near the cause as we possibly can, so as to know what remedy to apply.

Yours respectfully.

D. MACKIE.

The evidence submitted before the coroner's jury and myself is as follows:—

Pat Harding, pit-boss, being sworn, says as follows:

I am pit-boss; they were shot-firers; it occurred about 9 o'clock on Tuesday evening, the 29th of December 1891. They were down at 6 p. m. to fire shots; they are shot-firers. I told them not to fire more than two rooms at one time; they did not fire more than two rooms that I know of. There are from one to three shots in a room; if there are over three, their orders were to fire only one room. If there were over three shots in a room they were not allowed to fire them. Their orders were that every shot was to be examined before firing; they were not to fire any shots that were not safe, deeper than the thickness of the coal or gripping shots; no following shots allowed;* if there were any, they were to be fired in succession. Three shots were the limit at any one time in one room. Robert Brown has been firing for the company two and one-half years and was an expert; they were hired for that special purpose, nothing else. They were instructed to fire no shots where danger existed. We have had over a dozen quit because these men refused to fire shots, as they were dangerous. We had about 65 miners employed at the time. These men were all practical men as far as possible. A man who is not a practical miner cannot mine this coal. Sometimes it took them (the shot-firers) till 2 o'clock to fire the shots. The fan takes the smoke immediately. Sometimes they get out sooner than 2 o'clock. All I can say about the cause is a windy shot. It was not from impure air. I do not have the mine inspected in the morning, as it is not necessary. I have never found any gas in the mine at all.

I was in the mine on the 29th of December at 5 o'clock; its condition was good. There was no powder in the mine. It is against the rules to have powder in the mine. About 12½ pounds was all the powder a man could take into the mine; all that was left had to be taken back to the magazine under penalty of discharge. There has never been a man burned in this mine except at the times of explosion. The Keith & Perry Coal Company have always given all the instructions necessary for the safety of the men, and furnished everything asked for. There is no law in Missouri about the amount of powder allowed in a mine. We had to discharge men for not complying with this law. [Evidently intended to say for not complying with company's rules.]

PAT HARDING.

*Following shots are those preceded by a shot intended to open up or break away sufficient coal to permit the shot following thereafter to do good execution. What is probably intended by "no following shots allowed" is that the two shots above mentioned shall not be fired simultaneously.

G. R. Sweeney, being duly sworn, testified as follows:

I am superintendent of the Keith & Perry Coal Co. Have charge of Mine No. 7. The names of the parties killed were Robert Brown and Lincoln White. Their duties were to fire the shots loaded by the miners, nothing else. They got pay for full time. They were supposed to be on duty the full length of a shift, if necessary.

G. R. SWEENEY.

G. R. Sweeney, being re-called, says:

I do not know what caused this explosion. Every precaution has been taken to prevent an explosion. The mine is well ventilated, our air-shaft is large enough; we are required to furnish 100 cubic feet to the man, and we have furnished four times that amount. The fan is a 10-foot fan. The upcast is 7 feet by 4 feet 3 inches in the clear. The blades of the fan 4 by 3 feet. The capacity of the fan when speed is full, is 40,000 cubic feet per minute. The order of the fire bosses was not to fire more than three shots at any one time, and to fire no unsafe shots. I do not think the accident would have occurred had my instructions been faithfully carried out. My instructions were that the roadways were to be sprinkled and kept wet. We paid men to sprinkle the roads on Sunday. The north side of the mine is wet.

G. R. SWEENEY.

John Dobner, being duly sworn, testified as follows:

I am a miner for the Keith & Perry Coal Co. Have been for three months. I have been around the mines for twenty years. I was working in the northwest. The mine was well ventilated; my place was too well ventilated. I was working in the mine the day of the explosion. I do not use more than 6½ foot hole, 3½ grip and about two or three pounds of powder to the hole. I take my powder down at noon. I take down a 12½ pound can, and we use about all of it. The mine was sprinkled and the entries were all wet. The rooms were usually wet. I had sometimes to leave my shots on account of water. I never saw any gas in the mine. I have tried to light gas but could not.

JOHN DOBNER.

George Ellis, being duly sworn, said:

I am a miner. I have been working for the Keith & Perry Coal Co. since the shaft started. I was in the mine on the 29th day of December at 5 o'clock; I can not say what caused the explosion. I heard the shots going off at the time of the explosion; there were two shots in quick succession and one shot afterward. I thought Brown a good, competent man for that place. Bob drank some, but if he was under the influence of liquor he would have been prohibited from going in. The mine was in splendid condition. I know of men whose shots were not fired and who quit. I have known men discharged for putting in excessive shots. The roadways were all sprinkled on Sunday two days before the explosion. I take 12½ pounds of powder into the mine. What I do not use I take back into the magazine. No fire gas in the mine. I am a practical miner. Have mined coal for twenty years.

his
GEORGE X. ELLIS.
mark.

William Breen, being duly sworn, testified as follows:

I am a practical miner; have mined coal for thirty years. I work in the north. I was in the mine about eight days before the explosion. My place was in good condition; the ventilation was as good as I have seen in this country—better, I think. The roadways were kept sprinkled; they were kept wet. There was no fire-damp. I worked there every night with an open light. Never saw a safety lamp in the mine until the explosion. I use usually 12½ pounds of powder, sometimes not so much. I fired twice a day. (Probably working in entry where shots are more frequently fired.) Rooms only fire once a day.

WILLIAM P. BREEN.
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George Smith, being sworn, says:

I am a miner. Have mined for ten years. I work on the south. I was working in an entry. My entry was kept well ventilated. I came out at 5 o'clock on the evening of the explosion. I think it impossible for an explosion to occur with that ventilation. The explosion caused the fire. I was here but did not hear the shots. I take 12½ pounds powder in the mine. Sometimes do not use it all. I have from two to three shots ready; had loaded only two that evening. We were not allowed to fire any following shots. We had to put in a cutting for all narrow work. The roads were wet. When I went to work Tuesday I walked through water.

Brown was found 20 feet north of first west entry lying on face, head toward the north. From his position, I judged he had laid down. I think his hands were burned a little. Don't think burns caused his death. I think he died from the shock of the explosion. The mine was clear of fire-damp. L. White was lying 20 or 25 feet further north than Brown, in the same entry. He was lying on his face with his head toward the south, his hands under his face. Don't think he was burned enough to cause death. That was their hiding place when they were firing the shots in the 1st west entry on the north.

GEORGE SMITH.

W. H. Van Deuson, being duly sworn, testified as follows:

I am night fireman; have charge of the fan and machinery at night; I had charge on the evening of Dec. 29. The fan was running at the same rate of speed as usual, very fast, on the night of the explosion. They came out from 10 to 2 o'clock. When there was not much to do, they came out early. I do not know the speed of the fan. They went down about 6:30 p. m. They came out at 8. They had fired a windy shot and came out for smoke to get out. They said that was a bad shot, it was in the north. They staid out from 15 to 25 minutes. Explosion occurred within 15 or 20 minutes after they returned. All the warning I had was when I heard the noise, which jarred the engine-house. It sounded like distant thunder.

W. H. VAN DEUSON.

Frank Sample, being duly sworn, testified as follows:

I am a driver. I watered the roads the Sunday before the explosion. Ben Powell was with me. We sprinkled all the north entries and all the south, except the air-shaft entries. They were thoroughly wet. We have two plugs in water-box.

FRANK SAMPLE.

The following is in substance the statement made under oath before Mine Inspector, by W. H. Van Dusen, who was night-fireman at the time of the explosion:

"The shot-firers went down about 6:30 o'clock p. m. and the next thing I heard from them was about 8 o'clock, when they rang the bell and notified me that they were going north.

The shot-firers always notify me when they are going from one side of the mine to the other, so if any accident should occur they could be found.

About 8:15 or 8:30 o'clock they came to the bottom again and wanted to be hoisted out. I hoisted them out and they said, "we had a bad windy shot which nearly caught us." After waiting ten or fifteen minutes they went down, but did not exhibit any fear. The explosion was the next thing I heard after they went down. I do not remember of hearing any shots before that.

It was from ten to twenty-five minutes after they went down before the explosion occurred.

Jake Moody's (day-fireman) testimony in substance is as follows :

I came to the mine about 8 o'clock. Van Dusen, Robert Brown and Lincoln White were in the engine-room; the latter were preparing torches. I asked the shot-firers what they were doing and Bob said, "had a windy and came near being blown out." I asked where it was, and he said the first shots fired on the north. The shot-firers did not say whose room it was in, nor did they seem especially frightened, but Bob said: "Buddy, I hope to God it wont catch us in there again."

Mr. Moody says he went home a few minutes after shot-firers went down, and that he lived about one-eighth of a mile from the shaft; he heard two shots fired first thing after shot-firers went down, in quick succession, but could not tell direction; the next thing he heard was the explosion; was in house at the time.

He further avers that since date of first explosion he has been about the shaft at nights, and remembers counting as many as eleven shots, within one-half minutes time between first and last shots.

The substance of G. R. Sweeney's evidence, taken before me, is as follows :

I am superintendent of the Keith & Perry Coal Co. mines at Rich Hill, Mo. My instructions to miners are, that no shots be fired while men are in mine. We employ shot-firers to fire shots at night; they commence to fire any time after all the men are out of the mine; their instructions were to fire no shots that they thought not safe, and to examine every one before firing, and to fire only one room or heading at a time, and not more than three shots in such headings, and not to fire following shots together, and only two such in any case—these to be fired successively and if first does not have the proper effect the second shot is not to be fired (emphasized this by frequent interviews), and miners were instructed that grip of a hole shall not exceed the thickness of the coal, and firers are instructed to watch this; also no miner is allowed to take inside more than 12½ pounds of powder, which is the limit of the capacity of a can.

The Lafin & Rand F. F. powder is used by the miners.

Other evidence was taken, but we do not deem it necessary to publish it as most of it is simply a repetition of that included herewith.

The verdict of coroner's jury is as follows :

We, the jury, find from the evidence that Robert Brown and Lincoln White, whose dead bodies were found in mine No. 7, owned by Keith & Perry Coal Co. came to their death by an accident, caused by an explosion occurring while on duty firing shots on December 29. We exonerate the company from all blame.

B. F. MCFARLAND,
M. B. WILLSEY,
A. J. BOWYER,
ED. MINNIS,
N. B. GRAY.
J. H. MOODY (foreman).

The following reference to accidents occurring in coal mines during the past year is confined to those of a serious nature only.

BATES COUNTY.

John Chapman, a miner working at shaft No. 13, Rich Hill Coal Mining Co., was killed by a fall of roof. The deceased was 38 years of age—married, and the father of 5 children.

The following is a copy of the verdict of the coroner's jury:

State of Missouri, }
County of Bates. } ss

We, the jury, having been duly sworn and affirmed by L. O'Rear, coroner of Bates county, Missouri, diligently to inquire and true presentment make, in what manner and by whom John Chapman, whose dead body was found at mining shaft No. 13, of the Rich Hill Coal and Mining Co., on the 5th day of August, 1891, came to his death, after having heard the evidence, and upon full inquiry concerning the facts, and a careful examination of said body, do find that the deceased came to his death from stone falling on him accidentally.

(Signed)

JOHN HINES,
MORRIS WHITE,
MORRIS CLIFFORD,
GORDON DAVIS,
J. C. STOCKTON,
JOHN JOBSON.

From the evidence before the coroner's jury and a personal examination, we find that the deceased was working at the face of his room, located on the back main entry on west side of shaft. The room had been driven in about 75 feet from entry and was well timbered; props within six feet of face. It appears that the accident occurred while the deceased was loading his car, the roof falling upon and crushing him. The cause of the fall was a slip at a point in the roof where the shale was running out and the white top making its appearance. We are of the impression that the accident was unforeseen and unavoidable.

Lee Thompson, a laborer, was instantly killed at Sullivan & Chaney's strip-pit. Messrs. Rogers and Tipton, who witnessed the accident, state that the deceased was loading his wagon when the slide of earth caught and crushed him against the wagon.

Ralph Hall, a young man 16 years of age, employed as a mule driver, was run over by a car and killed in a mine of the J. M. Wise Coal Co.

The following is the coroner's verdict:

I, L O'Rear, coroner of Bates county, Missouri, after viewing the dead body of Ralph Hall, which was found in the coal pit of the J. M. Wise Coal Co., in Osage township, and after investigating all the witnesses necessary and taking their evidence down in writing, and after a post mortem examination, I declare that the said Ralph Hall came to his death by some internal injury caused by being thrown or falling under one of the mining cars by a sudden jerk or start of the mule which was hitched to the car, which weighed about from two to three thousand pounds, and the deceased probably being made sick or dizzy by inhaling the powder smoke which had not cleared away sufficient before he entered the pit.

(Signed),

L. O'REAR, Coroner.

November 24, 1891.

It appears from the evidence before the coroner that the deceased, on the day of the accident, was driving a mule, and had made several trips back and forth through the mine during the afternoon, and coming in contact with an unusual amount of powder smoke, it made him sick. Whether this had anything to do with the accident or not we are unable to state; nor could we find any one who did know how the accident occurred. All that is known positively is that the boy was found under the car, about 3:30 p. m., dead.

We examined the place where the accident happened, and found the road was in good condition—roof smooth, and nothing that would indicate that he had been thrown from the car. It is our opinion that for some reason, not entirely plain, the deceased fell from the front end of car, forward, and was caught and crushed by the cars following.

Mention is made of the accident at mine No. 15, of the Rich Hill Coal Mining Co., in which Samuel Pritchard and Thomas Davidson were burned. The object in calling attention to this accident is not because of its serious nature, but that we may cite an instance where an accident might have been avoided had our recommendation in the matter of allowing an interval between the firing of shots been observed. Pritchard and Davidson were employed as shot-firers; the room in which the shots were fired was about 12 yards from entry, and the shot-firers standing, when burned, about 130 feet from the shot-holes. Two shots were fired simultaneously, the flame being carried this distance and burning the two men as a result.

CALDWELL COUNTY.

James B. Tyndall, a miner, working at the Caldwell County Coal Co.'s mine, was caught by a cage and instantly killed.

The following is the verdict of the coroner's jury:

After viewing the body and hearing the evidence, do find that the deceased, James B. Tyndall, came to his death by being caught between the cage and timbers or curbing of the shaft of the Caldwell County Coal Mine, on the 3d day of December, 1891, and having his neck broken and causing instant death. We attach no blame to the Caldwell County Coal Co. or its management.

(Signed)

A. M. BROWN,
W. T. FILSON,
E. R. WHITE,
E. E. VAN SLYKE,
W. O. DODGE,
E. W. GILPIN.

Verdict approved.

(Signed)

W. J. WYATT, J. P.
Acting coroner.

From what we further learn concerning this accident, it appears that the deceased, with others, after finishing the day's work, had come to the surface, and was heard to remark when in the blacksmith shop that he had left his dinner bucket. Returning, as is supposed, to the shaft, he stooped over to request someone in the bottom to bring up his dinner bucket, when the descending cage caught him. A snow-storm was raging at the time, and all the men seem to have sought shelter, and for this reason, likely, the accident was not witnessed by anyone. The deceased was 42 years of age, married, and the father of five children. Fortunately for his family, he carried an insurance of \$2000.

GRUNDY COUNTY.

James Robinson, a miner, was killed at the Grundy County Coal Company's mine, his neck being broken by the cage.

The deceased, at the time of the accident, was engaged in timbering at the bottom of the shaft. The cage was on the bottom, when, needing something on the opposite side, the deceased started to cross over the cage and was warned that it was rung off. He stepped on cage, doubtless thinking he could jump, if necessary, but was caught before he could clear the same.

Coroner deemed inquest unnecessary.

HENRY COUNTY.

Isaac Sarles, a miner working at the Tebo Coal Company's mine, was killed by a fall of coal.

No inquest was held.

From the most reliable information obtained, it appears that the deceased was, at the time of the accident, engaged in undermining his coal, and neglecting to sprag as he should have done, the coal fell on him.

LAFAYETTE COUNTY.

George Oppie, a miner, was killed by a fall of rock in his working place at the Waverly Coal and Mining Co.'s mine. We learn that at the time of the accident the deceased was driving an entry, and understand that the mining boss had suggested the necessity of additional timbering, but by request of deceased the timbering was to be delayed until the following day, he claiming that timbers would be in his way.

Mr. Krass, who was caught by the same fall as deceased, though not injured much, informed me that at signal given he fired two shots in a back entry and went to the deceased to assist him fire two shots in his entry; that they lighted the two shots and started to run; just

then the fall of roof occurred, the deceased being in advance. Mr. Krass, not being seriously hurt, states that he returned to the shot-holes and pulled out the squibs. The fall was some eight feet from the face, and caused by a slip in the roof. No inquest was held.

Alfred Sandquest, employed as a miner at the Lexington Coal Mining Co.'s mine, was fatally injured by a fall of coal. Several hours after the accident occurred Mr. Sandquest stated that he alone was responsible. We learned that Mr. S. had undermined his coal and failed to sprag it, and at the time of the fall was leaning against the coal. Death resulted from his injuries on the following morning.

MACON COUNTY.

The number of serious accidents occurring in the mines of this county in the past year or two exceeds those of any previous experience. The great number of accidents due to falling roof has occasioned us much thought on the subject. While it is evident that very many of the accidents could have been prevented by proper precaution on the part of the miners, yet in our opinion the great first cause to which this character of accidents is attributable is the largely increased, and we think, excessive use of powder employed of late as compared with previous years. The explosions of powder in many instances blow the timbers out, cut and loosen the roof and hasten its fall. Some few years since nearly all the coal in this county was mined without the aid of powder, and accidents occasioned by falls of roof were of rare occurrence; but, since the employment of so much powder in mining the coal has come into use, accidents are increasing to an alarming extent. Another source of danger in this field arises from the use of mining machines. Although not many are in use, several serious accidents have occurred to parties using them by falls of roof and coal in the past few years. The accidents which may be attributed indirectly to machines are those where the noise of the machine prevents its operator and his assistant from hearing the warning sometimes given when a fall of coal or slate is about to occur. The assistant or shoveler, in the discharge of his duty, is required to work so near the face of the coal that when a fall occurs it is almost impossible for him to escape it. There is also found in this district what is known as a "bell rock," of a boulder-like formation, and when the coal is removed it is then and there ready for a fall. Great care should be exercised where such material exists.

(No. 11)—Nick Pussa, employed as a miner at Mine No. 42, Kansas and Texas Coal Co., was killed by a fall of slate in his working place.

The following is a copy of the verdict of the coroner's jury :

We, the jury, have decided that Nick Pussa came to his death by falling of a rock from the roof of Mine No. 42.

(Signed)

THOMAS L. MILES, foreman.

JOHN A. DALL, coroner.

From the evidence before the coroner's jury, it seems that the deceased neglected to prop his work sufficiently, although timber had been furnished him for that purpose.

James Hines, a miner, was killed by a fall of roof at the Kansas and Texas Coal Co.'s mine at Ardmore.

The following is a copy of the verdict of the coroner's jury :

We, the jury, find from the evidence that James Hines came to his death from a fall of rock, by his own negligence.

(Signed)

JOHN A. DALL, coroner.

JAMES M. FERGUSON,

F. W. DOOLEY,

JOHN P. TEMPLE,

I. H. STAMPER,

D. A. COLLINS,

THOS. BRIARLY,

Jury.

From the evidence given before the coroner, it is quite clear that the deceased had been warned by several parties of his danger in working under the loose rock. At the time, the deceased was removing a pillar of coal, and had fired a shot, and was removing loose coal when the rock fell.

John J. Evans a miner, employed at the mine of the Black Diamond Coal Co., was killed by a fall of roof in his working place.

The following is a copy of the verdict of the coroner's jury :

We, the jury, find from the evidence that the said John J. Evans came to his death by the fall of a rock through an accident, which was supposed to be safe by both parties.

(Signed)

JOHN A. DALL, coroner,

THOS. WARDELL, foreman,

W. C. CHITWOOD,

I. E. FRAME,

BENJ. HUGHES,

JOHN THOMAS,

JACOB BUCK.

From the testimony of witnesses before the coroner, and especially that of John M. Evans, who was working with the deceased at the time of the accident, we find that both were aware of the bad condition of the roof, and in confirmation of this, Mr. John M. Evans states that other miners were called in and the situation discussed. All seemed to

have agreed that additional propping was necessary. Only one additional prop was put in, according to the testimony.

W. T. Wallace, a miner working at J. G. Brock's contract mine, owned by the Kansas & Texas Coal Co., was killed by a fall of rock.

The following is the verdict of the coroner's jury:

We, the jury, find from the evidence in the case of inquest held on the body of W. T. Wallace, who was killed at J. G. Brock's coal-pit, operated by the Kansas & Texas Coal Co., in Narrows township, in Macon county, and State of Missouri, came to his death by the fall of rock.

(Signed)

W. R. BROWN,
WM. CROCKREN,
A. J. SUMMERS,
W. P. ASHLOCK,
W. R. HERRINGTON,
I. E. SEVIER.

From the evidence before the coroner's jury, we notice that W. R. Wallace, a son of the deceased, who was working with his father, testified that the room was not regarded as a safe one. He also testified that his father was making a cutting at the time of the accident, and that plenty of props were on hand.

From all that we can gather from the evidence, it looks like the deceased was working at the face, with possibly not enough room to do his work conveniently and use additional props, and that the fall was due to a slip in the roof, close up to the face of the coal.

George Shoemaker, a miner, killed by a fall of slate at mine No. 43, Kansas & Texas Coal Co.

The following is a copy of the verdict of the coroner's jury:

We, the jury, in the case of the inquest held on the body of George W. Shoemaker in Bevier, in Bevier township, Macon county, Missouri, on the 24th day of February, 1892, find that the deceased came to his death by a fall of slate while loading a car in his room at Kansas & Texas Coal Co.'s mine No. 43, said room being room No. 2, on third west entry on north side of shaft.

(Signed) D. J. HUGHES, foreman.

JOHN J. BROMMER,
G. W. BELL,
D. F. BURRIS,
WM. WEEKS.

We further find from the evidence before the coroner's jury that the deceased was loading a box of coal when a piece of slate fell and caught his head on the edge of the box, killing him instantly. It is claimed that the room was well propped and plenty of timber on hand.

John Robinson, a miner working at Mine No. 4, Loomis & Snively Coal Company, was killed by a fall of rock.

The following is a copy of the coroner's verdict:

We, the jury, find that John L. Robinson came to his death by his own neglect in Mine No. 4.

[Signed]

W. C. CHITWOOD, Foreman,
JNO. T. MITCHELL,
D. L. JAMES,
B. C. DENNEY,
S. J. HORRISTER,
J. D. JOEMBER.

From the evidence before the coroner's jury, it is evident that there were not enough props in position under the dangerous portion of the roof, though a sufficient number of props were at hand that could have been used. The father of the deceased and the deceased were working together, and both were covered by the fall of rock; the father was also injured by the fall.

John Miller, a laborer, was killed by a fall of coal in Mine 4 operated by Loomis & Snively.

The following is a copy of the verdict of the coroner's jury:

We, the undersigned jurors, summoned in the case of John Miller, killed in mine No. 4, owned and operated by Loomis Coal Co., by falling coal, do find by the testimony that the deceased came to his death through no fault of any one, being purely accidental no one to blame.

(Signed)

W. M. HARDESTY,
J. W. WHITAKER,
L. G. GILSTRAP,
J. N. DENNEY,
J. W. SCHANK,
H. ECKLES.

It appears from the evidence before the jury that the deceased was shoveling coal at the time of the accident, being associated with R. L. Sids, who was using a mining machine. Mr. Sids states that the deceased, in attempting to evade the fall of coal, ran against a prop which probably prevented his escape.

M. F. Garrett, a miner working at mine No. 26, Kansas & Texas Coal Co., was caught by a fall of rock at the face of his room on the 28th of Sept. 1891, and died from the effects of his injuries in December 1891.

RANDOLPH COUNTY.

Brown Reed, a colored man, and a miner working at Mine No. 1½, owned and operated by John Breckenridge, was seriously injured Dec. 15, 1891, by a fall of rock in his working place. He died Jan. 6, 1892, after the amputation of one of his legs. It is claimed that the deceased was warned of his danger but a few minutes before the accident occurred.

VERNON COUNTY.

W. R. Metz, shot-firer at Mine No. 7, Keith & Perry Coal Co., was killed by an explosion Oct. 7, 1891.

Robt. Brown, shot-firer at Mine No. 7, Keith & Perry Coal Co., was killed by an explosion Dec. 29, 1891.

Lincoln White, shot-firer at Mine No. 7, Keith & Perry Coal Co., was killed by an explosion Dec. 29, 1891. Details concerning all three of the fatal accidents in this county may be seen by some reference to the following report on explosions.

After the numerous investigations which we have made of the character and cause of these accidents, and a careful study of the same, we have arrived at the conclusion that a large percentage of them occur just after a shot has been fired and the return of the miner to his room. The anxiety of the miner, as a rule, to take advantage of a good fall of coal to load his cars (and as many of them) as soon as possible, often causes him to overlook the possibility of his roof having been made dangerous by the last shot, or that a prop or two has been knocked out. Then there is a tendency, though observation may have discerned a dangerous place, to postpone the needed propping until his room or place is cleared up. In no instance can we find a more suitable place or condition for the application of the old proverb: "An ounce of prevention is worth a pound of cure."

TABLE XI—SHOWING ACCIDENTS IN COAL MINES, BY COUNTIES, FOR YEAR ENDING JUNE 30, 1892.

BARTON COUNTY.

Name of employer.	Name of employee.	Occupation.	Age.	Single.	Married.	No. of children.	Non-fatal.	Fatal.	Was the injured party insured?	Amount of insurance.	Nature of accident.	Coroner's verdict.
Morgan, C. H. (Minden mine)	McCluskey, Thos.	Mine-boss	.....	1							Leg broken by mining car.	

BATES COUNTY.

Rich Hill Coal Co.	Chapman, John	Miner	38	1	5						Fall of slate	Accidental
"	Davidson, Thos	Shot-firer	26		1						Flame from windy shot.	
"	Davis, A. J.	Miner	39		1						Flying coal from a shot.	
Western Coal & Mining Co.	Dumfield, S	"	34		1						Fall of roof	
Rich Hill Coal & Mining Co.	Dumfield, D	"	60		1						Caught by cage	
"	Erskine, Andrew	"	46		1						Flame from windy shot.	
"	Terry, John	"	23		1						"	
"	Grackans, John	"	21		1						Flying coal from a shot	
Wise, J. M. Coal Co.	Hall, Ralph	Mule driver	16	1							Caught under car.	
Rich Hill Coal Co.	Harner, August	Miner	23		1						Burned with gas.	
"	Jenkins, Wm	"	39		1						Flame from windy shot	
"	McCoy, Thos	Loader	22		1						Fall of roof	
Western Coal & Mining Co.	Mize, John	Miner	40		1						"	Accidental
Rich Hill Coal & Mining Co.	Nash, Joseph	Driver	27		1						Mining car.	
"	Nelson, H	Miner	50		1						Fall of roof	
"	Pritchard, Samuel	Shot-firer	23		1						Flame from windy shot.	
"	Roansman, Peter	Loader	50		1						Fall of top coal	
Sullivans, Wm, strip-pit	Thompson, Lee	Laborer	22	1							Loading in strip-pit—fall of earth	
Rich Hill Coal & Mining Co.	Turner, George	Cager	34		1						Mine car	Accidental
Totals			2	1	5	16	8					

CALDWELL COUNTY.

Caldwell Coal Co.	Tyndall, Jas. B.	Miner	42	1	7	1	1	\$2,000	Caught by cage
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GRUNDY COUNTY.

Grundy County Coal Co.	Robertson, Jas.	Miner	82	1	1	1	1	Caught by cage
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HENRY COUNTY.

Thompson, B. L. Mine.	Ford, Walter.	Miner	1	1	1	1	1	Fall of roof.
Owens, B. L. Mine.	Filewood Henry.	"	1	1	1	1	1	"
Keith & Perry Coal Co.	Giltner, Daniel.	"	1	1	1	1	1	.....	" .....
Tebo Coal Co.	Mallow, Arthur.	"	54	1	6	1	1	.....	Fall of coal.
Totals.	Sarles, Isaac.	"	1	6	4	1	1	.....

LAFAYETTE COUNTY.

Napoleon Coal & Mining Co.	Hill, James.	Miner	28	1	1	1	1	.....	Fall of roof.
Young, Frederick.	Key, J. W.	"	81	1	1	1	1	.....	Fall of coal.
Lexington Coal & Mining Co.	Kaifer, Jacob.	"	24	1	1	1	1	.....	Caught by the cage.
Mayview Coal Co.	Legate, Sumner.	Road hand	48	1	1	1	1	.....	Fall of roof.
Young, Frederick.	Martin, Brad.	Miner	33	1	1	1	1	.....	" .....
Lexington Coal & Mining Co.	Martin, C.	"	32	1	1	1	1	.....	" .....
Waverly Coal Co.	Oppie, George.	"	32	1	1	1	1	.....	No inquest.
Lexington Coal & Mining Co.	Sandquest, Alfred.	"	58	1	2	1	1	.....	" .....
	Shinn, Henry.	"	45	1	1	1	1	.....	Fall of coal.
Totals.			1	1	2	7	2	.....

MACON COUNTY.

ACCIDENTS IN COAL MINES—Continued.

Name of employer.	Name of employe.	Occupation.	Age	Single	Married	No. of children	Non-fatal	Fatal	Was the injured party insured? Yes No.	Amount of insurance	Nature of accident.	Coroner's verdict.
Black Diamond Coal Co	Evans, John J.	Miner	24		1	6	1	1			Fall of roof	Accidental.
Kansas & Texas Coal Co	Garrett, M. F.	"	53		1						"	No Inquest
"	Guiley, W. B.	"	60		1						"	"
"	Hines, James	"	32		1						"	Accidental
Loomis Coal Co	Miller, John	"	28		1						Fall of coal	"
Kansas & Texas Coal Co	Moore, John	"	14		1						Fall of roof	Fall of rock
"	Pussa, Nick	"	30		1						"	Accidental
Loomis Coal Co	Robinson, John	"	22		1						"	"
"	Robinson, James	"	55		1						"	"
Kansas & Texas Coal Co	Roncheto, John	"	28		1						Fall of stone at face.	Fall of slate.
"	Shoemaker, G. W.	"	23		1						Fall of roof	Fall of rock
"	Wallace, W. T.	"	43		1						"	"
"	Weeks, James	"	31		1						"	"
Totals			2	6	15	5	8					

RANDOLPH COUNTY.

Breckenridge, John, Mine	Courtwright, W. C.	Miner					1				Fall of roof	No Inquest
"	Harris, Joseph	"	25		1						"	"
"	Reed, B.	"									"	"
Totals				1			2	1				

EAY COUNTY.

Richmond Coal Co	Armstrong, James	Miner	1	Fall of coal
"	Blair, A.	"	1	"
Hubbell Coal Co.	Irons, George	"	1	Fall of roof
Richmond Coal Co	Maidmont, C.	"	1	"
"	Zuklin, F.	"	1	Fall of coal
Totals			6	

VERNON COUNTY.

Keth & Perry Coal Co	Alger, Amos	Shot-firer	33	1	Explosion	Accidental
"	Brown, Robert	"	35	1	"	"
"	Metz, W. E.	"	34	1	"	"
"	White, Lincoln	"	28	1	"	"
Totals.			311	3		

LIST OF COAL-MINE OPERATORS.

ADAIR COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Ford, A.....	Stahl.....	Stahl.....
Harriott Bros.....	".....	".....
Ledford, Jacob.....	".....	".....
*Pennsylvania Coal Co.....	Kirksville.....	Danforth and Stahl..
Sanks, Robt. B.....	".....	Kirksville.....
Scott, D. C.....	".....	".....
Stanley, S. H.....	Greencastle(Sul'van Co)	Greencastle.....

AUDRAIN COUNTY.

*Audrain Mfg. & Coal Mining Co...	Vandalia.....	Vandalia.....
Detiennee, Omer.....	Mount Carmel.....	Mount Carmel.....
Eastham, C. P.....	Laddonia.....	Laddonia.....
Howarth, John.....	Mount Carmel.....	†Mount Carmel.....
Lynch, Owen.....	Laddonia.....	Laddonia.....
Martinsburg Coal Co.....	Martinsburg.....	†Martinsburg.....
Montague, James D.....	Laddonia.....	Laddonia.....
Robbins & Mathews.....	Worcester.....	Worcester.....
Sherman & Bethel.....	Farber.....	Farber.....
*Vandalia Coal Co.....	Vandalia.....	Vandalia.....
Wiley, Frank.....	Centralia.....	Centralia.....

*Employing more than 10 men. †New mine.

BARTON COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Bacon, W. S.....	Boston.....	Lamar.....
Betz, John.....	Liberal.....	Liberal.....
Blacker, O. C.....	Esrom.....	Esrom.....
Boulware & Co.....	Liberal.....	Liberal.....
Campbell, John.....	Iantha.....	Iantha.....
Clark, Wilson.....	Lamar.....	Lamar.....
Clark & Berker.....	".....	".....
Clark, W. C.....	".....	".....
Cole, M.....	".....	".....
Ferguson, John C.....	Nashville.....	Nashville.....
Gilmore, James W.....	Verdella.....	Verdella.....
Glaze & Getz.....	Lamar.....	Lamar.....
Hatfield, H. C.....	Liberal.....	Liberal.....
Hays, Basil D.....	Lamar.....	Lamar.....
Jones, Wm.....	Verdella.....	Verdella.....
Kimball, Dan ¹	Lamar.....	Lamar.....
King, J. M., & Bicknell.....	Pedro.....	Pedro.....
*Lanyon, S. H. & Bro.....	Pittsburg, Kas.....	Minden.....
Laws, J. E.....	Boston.....	Boston.....
*Liberal Coal Co.....	Liberal.....	Liberal.....
Lucas, M. H.....	Pedro.....	Pedro.....
Moran, M.....	Boston.....	Boston.....
Perkins, John.....	Liberal.....	Liberal.....
Ryan, G. C.....	Milford.....	Milford.....
Spear, D. M.....	Lamar.....	Lamar.....
Spring, Mattie B.....	".....	".....
Stukey, E. M.....	Boston.....	Boston.....
Sturdevant, J. C.....	Lamar.....	Lamar.....
Sumpter Mine.....	Liberal.....	Liberal.....
*The Wear Coal Co.....	Minden Mine.....	Minden Mines.....
Waite, C. G.....	Pittsburg, Kas.....	
*Whitsell, H. J.....	Liberal.....	Liberal.....

*Employing more than 10 men.

BATES COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Baldwin, L.	Worland.	Worland.
*Bates County Co-operative.	Amoret.	Amoret.
*Blue Lick Coal and Mining Co.	"	"
Bright, J.	Worland.	Worland.
*Bruce, Wallace.	Rich Hill.	Shobe.
Caton, H. F.	Worland.	Worland.
Cooper, Benjamin.	Amoret.	Amoret.
*Deering, Robert.	Hume.	Hume.
Ford, John A.	Rockville.	Rockville.
Harris Bros.	Worland.	Worland.
Higley, J. B.	Appleton City.	Appleton City.
Hines Bros.	Rich Hill.	Rich Hill.
*Hocker Bros.	Amoret.	Amoret.
Hopkins, S. W.	Rich Hill.	Rich Hill.
Hunt Bros. (Reese pits)	Worland.	Worland.
*Johnson, W. R.	Hume.	Hume.
*Kincald & Co.	Worland.	Worland.
March, John J.	Reavley.	Reavley.
Mascot Coal and Mining Co.	Amoret.	Amoret.
Miller, Dennis.	Foster.	Foster.
*Morgan, J. C.	Worland.	Worland.
Morgan, Samuel.	Hume.	Hume.
Newberry, John B.	Spruce.	Spruce.
Pearson, Peter.	Rich Hill.	Rich Hill.
*Peeler, D. D.	Rockville.	Rockville.
Raney, F. A.	Worland.	Worland.
*Rich Hill Coal and Mining Co.	Rich Hill.	Rich Hill.
* " F. M. Martin.	"	"
* " Sim. Jay.	"	"
* " T. Graham.	"	"
* " Wise Bros.	"	"
*Russell & McBride.	Amoret.	Amoret.
*Seawell, J. M.	Kansas City.	Rich Hill.
Skillman, A.	Foster.	Foster.
Spencer, O.	Rich Hill.	Rich Hill.
Springer & Enterman.	Worland.	Worland.
Springer & Gardner.	"	"
Standish, S. L.	Hume.	Hume.
Sullivan, W. M.	Rich Hill.	Rich Hill.
*Thompson Coal Fuel Co.	Kansas City.	Amoret.
Thurman, E. H.	Hume.	Hume.
Vance, J. A. & McAlley.	Amoret.	Amoret.
Vaughn, N. R.	Worland.	Worland.
*Western Coal & Mining Co.	Foster.	"
Wilbor, W. W. & Co.	Amoret.	Amoret.
*Wise, J. M.	Rich Hill.	Rich Hill.
Woodson & Woodson.	"	"

*Employing more than 10 men. †New shaft.

BOONE COUNTY.

Name of operator or company.	Postoffice.	Mine located near
*Benefield, B. S.....	Columbia.....	Columbia.....
Centralia Coal Co.	Centralia	Centralia
*Columbia Coal & M. Co.....	Columbia	Columbia
Davis, Isaac.....	Brown's Station.....	Brown's Station.....
Gaither, James W.....	"	"
*Gooding, W. A. & Co.....	Columbia	Columbia
Gossett, John F.....	Switzler Station.....	Switzler Station.....
Jones, Walter.....	Columbia	Columbia
Petro, M. C.....	"	"
Oldham, H.....	Centralia	Centralia
Stidham, W. A.....	Harrisburg	Harrisburg
Stone, J. W.....	Perche.....	Perche.....
*Wald, Andrews & Co.....	Sturgeon.....	Sturgeon
Winterholter, John.....	Brown's Station.....	Brown's Station.....

CALDWELL COUNTY.

*Caldwell Coal Co.....	Hamilton.....	Hamilton.....
*Cowgill Mining Co.....	Cowgill.....	Cowgill.....
*Hamilton Coal Co.....	Hamilton.....	Hamilton.....
*Kingston Coal Co.....	Kingston.....	Kingston.....

CALLAWAY COUNTY.

Castle, Wm.....	Fulton.....	Fulton.....
Criawell, A. W.....	Guthrie.....	Guthrie.....
*Fulton Fire-brick and Mining Co..	Fulton.....	Fulton.....
Guy, W. M.....	Stephens' Store.....	Stephens' Store.....
Harris, John.....	Fulton.....	Fulton.....
*Harris Bros.....	"	"
Henderson, I. S.....	McCredie.....	McCredie.....
Marsenkoff, John.....	Fulton.....	Fulton.....
Smith, James.....	"	"
Tharp & James.....	"	"

CARROLL COUNTY.

Brooks, Henry.....	Carrollton	Carrollton
Christmas, Leander.....	"	"
Farr, Ralph.....	Little Compton.....	Little Compton.....
Jenkins, David.....	Carrollton	Carrollton.....
Wallace, Thomas J.....	"	"

CEDAR COUNTY.

Name of operator or company.	Postoffice.	Nine located near
Ashenfelter, F. G.....	Jerico	Jerico
Cole, John S.....	"	"
Daniels, Lee.....	"	"
Davis, A. B.....	"	"
Duncan, J. C.....	"	"
Long, D. J.....	"	"
Packard, Wm	"	"
Poage, G. M	"	"

* Employing more than 10 men.

CHARITON COUNTY.

Bruce, W. B.....	Brunswick.....	Brunswick.....
Cowser, John D	Mike	Mike
Faller, Joseph	Indian Grove.....	Indian Grove.....
Holloway, Z. T.....	Rothville.....	Rothville.....
Huenten, John.....	Gathridge Mills	Gathridge Mills.....
Isle, J. A.....	Brunswick	Brunswick
Isle, J. Wesley.....	Indian Grove.....	Indian Grove.....
Kinzle, Thomas	Muscle Fork.....	Muscle Fork.....
Muckey, Geo. W.....	Newcomer	Newcomer.....
Prather, M. B.....	Salisbury.....	Salisbury
Riddle, E. E.....	Triplett	Triplett
Sublett, T. C.....	Mendon.....	Mendon.....
Sweatman, A. G.....	Salisbury	Salisbury
Williams, C. M.....	Marceline (Linn Co.)...	Marceline (Linn Co.)...

COLE COUNTY.

Caspari, F.....	Elston.....	†Elston
Elston Coal Mining Co.....	"	"
Leach, Geo. H., & Co	"	"

COOPER COUNTY.

Hazell, Chas. W.....	Boonville	Boonville
Jenkins, H. W.....	"	"
*Missouri Valley Coal and Mining Co	"	"
Palmberg, A	Bunceton	Bunceton
Smith, Wesley	Boonville	Boonville

*Employing more than 10 men. †New mine.

DADE COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Clayton, W. R.....	Sylvania.....	Sylvania
Leonard, Andrew	"	"
*McCluey, Robt.....	"	"
McGarvey's Mine.....	"	"
Ramsey & Evans.....	"	"
Sharp, R. M.....	"	"
Shoemaker, J. K.....	Cedarville.....	Cedarville.....
*Zook, Eli	Sylvania.....	Sylvania.....

GRUNDY COUNTY.

*Grundy County Coal Co.....	Trenton.....	Trenton
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HENRY COUNTY.

*Baldwin & Fonda.....	Calhoun.....	Calhoun.....
*Beaman & Harbit.....	Windsor	Windsor.....
Boyles, Geo.....	Garland.....	Garland.....
Carpenter, Henry	Clinton	Clinton
*Co-operative Coal Co.....	Lewis Station.....	Lewis Station
*Dunham, R. G.....	Deepwater	Deepwater
*Dunlap Coal Co.....	Brownington	Brownington
England, Wm.....	Clinton	Clinton
Evans, C. W.....	Lewis Station.....	Lewis Station
Gerhart, Theo	Clinton	Clinton
Gibbs, Henry	Montrose	Montrose
*Hayward & Eaton.....	Deepwater.....	Deepwater
*Hobbs, H. B.....	"	"
Humbrick, Chas.....	Clinton	Clinton
*Hurst, J. W.....	Deepwater.....	Deepwater
*Kay Coal Co.....	"	"
*Keith & Perry Coal Co.....	Kansas City.....	"
Keller, J. H.....	Montrose	Montrose.....
Kinney, J. B.....	Clinton	Clinton
Legg, J. P.....	Calhoun.....	Calhoun.....
*McFadden & Co.....	Deepwater.....	Deepwater.....
Munday, H. T.....	Calhoun	Calhoun.....
Otto, Wm.....	Appleton City (St. Cl.)	"
Owen, B. L.....	Clinton	Clinton
Phillips, Dr. R. S.....	Lowry City (St. Cl. Co.)	Garland.....
*Pigg, D. B., Coal & Mining Co.....	Lewis Station.....	Lewis Station.....
Price, B.....	Lucas.....	Lucas.....
Rhodes, John.....	Montrose.....	Montrose
Rivier, W. G.....	Clinton	Clinton
Rusk, Wm.....	Deepwater.....	Deepwater.....
*Tebo Coal Co.....	Lewis Station.....	Lewis Station.....
*Thompson, John & Co.....	Brownington	Brownington
Trent, Henry.....	Urich	Urich
Tyree, Joseph.....	Montrose	Montrose.....
Wells, T. J.....	Windsor	Windsor.....
*Woods & North (Hurst Coal Co.)..	North.....	North.....
Young, L. P.....	Garland.....	Garland.....

JACKSON COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Kansas City Clay & Coal Co.....	Kansas City.....	Kansas City.....

JOHNSON COUNTY.

*Boyd, Thos. H. & Sons.....	Knob Noster.....	Knob Noster
Bullock, D. A.....	Warrensburg	Warrensburg
Fitch, P. D.....	Montserratt	Montserratt.....
Herrington, Louis M.....	Warrensburg	Warrensburg
House, John F.....	Knob Noster.....	Knob Noster.....
Mack & W. F. Marten.....	Montserratt	Montserratt.....
*Melley, M. B.....	Warrensburg	Warrensburg
Murley, Joseph.....	Montserratt.....	Montserratt.....
Murry, Mat.....	Warrensburg.....	Warrensburg
Queener, E. H.....	Warrensburg	Warrensburg
Ronemans, W. L.	"	"
Shaeffer, David.....	"	"
*Staley, M. R.....	"	"
Strickland, Geo. W.....	Dunksburg	Dunksburg
The Park bank.	"	"
Wood, B. F.....	Warrensburg	Warrensburg

LAFAYETTE COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Bell, W. H.	Corder.	Corder.
*Bell & Greene	Lexington.	Lexington.
*Bonanza Coal Co.	Higginsville.	Higginsville.
*Bruce & Knoble	Kansas City.	"
Carter, Andrew	Wellington.	Wellington.
*Clark, Thomas	Lexington.	Lexington.
*Corder Coal and Coke Co.	Corder.	Corder.
Crumpley, E. P.	Aullville.	Aullville.
DeBolt, J. H.	Corder.	Corder.
*Dover Coal Co.	Lexington.	Dover.
*Excelsior Coal and Coke Co.	Higginsville.	Higginsville.
*Farmers' Coal and Mining Co.	"	"
Fox, N. F.	Dover.	Dover.
*Francisco Coal Co.	Lexington.	Waverly.
*Gunn & Co.	Higginsville.	Higginsville.
*Hagood Coal Co.	"	"
*Hartman, Chas. H.	Kansas City.	Waterloo.
Hoffman, E.	Higginsville.	Higginsville.
Kelley Coal Co.	Lexington.	Lexington.
Keist, Joseph.	"	"
Krampf, Robert.	Concordia.	Concordia.
Kresse, A. F.	"	"
*Lafayette Coal Co.	Lexington.	Lexington.
Leffman, Frederick.	Corder.	Corder.
*Lexington Coal and Mining Co.	Lexington.	Lexington.
*McGrew, J. C.	"	"
*Macey, Henry	"	"
*Mayview Coal Co.	Mayview.	Mayview.
†Meinerhagen, Frederick.	Lexington.	"
*Missouri River Coal and Mining Co.	"	Napoleon.
Morrison Bros.	"	Lexington.
*Napoleon Coal and Mining Co.	Napoleon.	Napoleon.
O'Malley, Andrew.	Lexington.	Lexington.
Powell, E. B. (John Longess)	Higginsville.	Higginsville.
Riely & Co.	Lexington.	Lexington.
*Rocky Branch Coal Co.	Higginsville.	Higginsville.
*Seawell, J. M. & Co.	Kansas City.	Wellington.
Spruil, T. F.	Norborne (Carroll Co.).	Dover.
Steinman, H. (R. Krampf)	Concordia.	Concordia.
Summers, M. W.	Alma.	Alma.
St. Clair, Harry.	Greenton.	Greenton.
*Stealey & Fowler Coal Co.	Higginsville.	Higginsville.
Tate, Geo. W.	"	"
*Waverly Coal and Mining Co.	Waverly.	Waverly.
*Walton Thomas	Lexington.	Lexington.
*Wellington Coal Co.	Wellington.	Wellington.
*Wilkes, J. E. (Hawkins & Smith, lessees).	Higginsville.	Higginsville.
*Winsor Coal Co.	Lexington.	Lexington.
Wright, James J.	Higginsville.	Higginsville.

* Employing 10 or more men. † New mine.

LINN COUNTY.

Name of operator company.	Postoffice.	Mine located near
Blacklock, Jacob	Forker	Forker
Bottomly, J. C. (Morris mine.)	Brookfield	Brookfield
*Clark's Coal Mines (Geo.)	"	"
*Hause, Peabody & Co.	"	"
*Kansas & Texas Coal Co.	St. Louis	Marceline
Landreth, R. F. & Son	Marceline	"
*Schaeffer, Bernard	Brookfield	Brookfield

LIVINGSTON COUNTY.

Black Diamond Mine	Chillicothe	Chillicothe
Cox, W. A.	"	"

MACON COUNTY.

Bachelder, Geo. W.	Macon City	Macon City
*Bevier Black Diamond Coal Co.	Bevier	Bevier
Blamset, W. J.	Macon City	Macon City
Brennan, Pat	Excello	Excello
Frede, Wm	Macon City	Macon City
Fischer, Wenzel	"	"
Harrold, John	"	"
Havard, Wm	New Cambria	New Cambria
Hunt, Thos. B.	Macon City	Macon City
*Kansas & Texas Coal Co	St. Louis	Ardmore and Bevier.
*Little Pittsburg Coal Co	Lingo	Lingo
*Loomis Coal Co.	Bevier	Bevier
*Macon Coal Co	Macon City	Macon City
*Oakdale Coal and Mining Co.	St. Joseph	Bevier
Phipps, J. R. & Son	College Mound	College Mound
Richmond, I. G	"	"
Rowland, Peter F	Macon City	Macon City
Smith, Geo. E.	"	"
Summers, Jack	"	"
Terrell, Robt.	"	"
*Watson Coal Co.	Bevier	Bevier
Zollman, Louis	Macon City	Macon City

MILLER COUNTY.

Rusk, Louis	Eldon	Eldon
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MONROE COUNTY.

Hughes, Lad	Victor	Victor
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MORGAN COUNTY.

Name of operator or company.	Postoffices.	Mine located near.
Davidson, Neilson & Lawton.....	Versailles.....	Versailles.....

MONTGOMERY COUNTY.

*Vandalia Coal Co.....	Wellsville.....	Wellsville.....
Whitehead, Henry.....	".....	".....

NODAWAY COUNTY.

Carden, W. J.....	Quitman.....	Quitman.....
Dixon, E.	Burlington Junction...	Burlington Junction.
Holtz, W. R., & Carden.....	Quitman.....	Quitman.....
Nichols, Joseph M.....	".....	".....
Pearson & Co.....	".....	".....
Pierson Mine.....	".....	".....
Roberts, N.	".....	".....

PUTNAM COUNTY.

Adkins, Wm.....	Blackbird.....	Blackbird.....
Arnold, A., & Tippet.....	Unionville.....	Unionville.....
*Blackbird Coal Co.....	Blackbird.....	Blackbird.....
*Mendota Coal and Mining Co.....	Mendota.....	Mendota.....
Pharigo, Martin.....	Elko.....	Elko.....
*Smith, Joseph (Secord mine).....	Unionville.....	Unionville.....

*Employing 10 or more men.

PETTIS COUNTY.

Brooks & Shea.....	LaMonte.....	†LaMonte.....
Drummond, R. J.....	".....	".....
Thatcher, P. A.....	Green Ridge.....	Green Ridge.....
Searan, Thos.....	Dunksburg.....	Dunksburg.....

BALLS COUNTY.

Boulware, E. S.....	Perry.....	Perry.....
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RANDOLPH COUNTY.

Name of operator or company.	Postoffice.	Mine located near
*Breckenridge, John.....	Huntsville.....	Huntsville.....
Brennan, Wm.....	Moberly.....	Moberly.....
*Caffery & Baker Coal mines.....	Huntsville.....	Huntsville.....
Dean, Harvey.....	Jacksonville.....	Jacksonville.....
Edwards, Emanuel.....	Huntsville.....	Huntsville.....
*Higbee Coal and Mining Co.....	Higbee.....	Higbee.....
Hoover, Jacob.....	Moberly.....	Moberly.....
*Interstate Coal and Mining Co.....	Higbee.....	Higbee.....
Lowes, John.....	Huntsville.....	Huntsville.....
Mathers, Mrs. Catharine.....	Rolling Home.....	Rolling Home.....
Milburn, Joseph & Sons.....	Thomas Hill.....	Thomas Hill.....
Mitchell, W. E. & Co.....	Huntsville.....	Huntsville.....
*Moberly Mutual Coal Co.....	Moberly.....	Moberly.....
Reed, James.....	Rolling Home.....	Rolling Home.....
*Renick Coal Co.....	Renick.....	Renick.....
Robuck, W. K.....	Moberly.....	Moberly.....
*Rutherford, H. L. & Son.....	Huntsville.....	Huntsville.....
Schneider, John.....	Moberly.....	Moberly.....
Streiff, Mike.....	Huntsville.....	Huntsville.....
*Ward, Harry.....	Moberly.....	Moberly.....
Williams, J. B.....	".....	".....
Young & Co.....	".....	".....

*Employing 10 or more men. †New mine.

RAY COUNTY.

*Bissell Coal Co.....	Orrick.....	Orrick.....
*Black Diamond Coal Co.....	Richmond.....	Richmond.....
*Bovard*Brown Coal Co.....	Camden.....	Camden.....
Buchlinger, Fred.....	Hardin.....	Hardin.....
Chew, Mandry.....	Richmond.....	Richmond.....
*Darneal Coal Co.....	".....	".....
Dickinson, H. A. & Son.....	Hardin.....	Hardin.....
*Douglas, W. S. & Moore.....	Richmond.....	Richmond.....
*Hartwell, Arnold & Co.....	Norborne (Carroll Co.).....	".....
Hensley, Wm.....	Camden.....	Camden.....
*Hubbell Mining Co.....	Richmond.....	Richmond.....
*Hubbell, Hyatt & Hubbell.....	".....	".....
Huston, Joseph.....	Norborne (Carroll Co.).....	".....
*Kansas & Texas Coal Co.....	St. Louis.....	Fleming.....
McCorkendale, John.....	Hardin.....	Hardin.....
Murray & James.....	Richmond.....	Richmond.....
Phillips' Bank (Wm.).....	Norborne (Carroll Co.).....	Hardin.....
*Pickering, Joseph.....	Richmond.....	Richmond.....
*Rankin, W. D.....	Lexington.....	".....
*Richmond Coal Co.....	Richmond.....	Richmond & Camden
Sater, W.....	Georgeville.....	Georgeville.....
Scrivens, W. W.....	Norborne (Carroll Co.).....	Hardin.....
Sickles, Wm.....	".....	".....
Williams Coal Co.....	Swanwick.....	Swanwick.....

SALINE COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Alexander, Frank	Arrow Rock	Arrow Rock
Briggs, Isaac	Slater	Slater
Cordell, R. M.	Mt. Leonard	Mt. Leonard
Dickinson, Thos., & Son	Sweet Springs	Sweet Springs
Durnil, Peter	Elmwood	Elmwood
Hedges, W. S.	Slater	Slater
Hunter, Barney.	"	"
McGinnis, Wm. M.	Cretcher	Cretcher
*Marmaduke, H. H.	Sweet Springs	Sweet Springs
Wilburn Coal Co.	Marshall	Napton
White, Sam'l	Elmwood	Elmwood

SCHUYLER COUNTY.

Gorman, Pat	Dean, Iowa	Coatesville
James, W. F.	Coatesville	"
Mock & Bro., A.	"	"

SULLIVAN COUNTY.

Kint Coal Mine	Green City	Green City
*Milan Land and Coal Mining Co...	Milan	Milan

ST. CLAIR COUNTY.

Alexander, J. W.	Appleton City	Appleton City
Browning, W. G.	Lowry City	Lowry City
Cook, Hiram	Appleton City	Appleton City
*Douthat, D. T.	Vista	Vista
Johnson, J. M.	Taberville	Taberville
Merryfield, S. O.	Johnson City	Johnson City
Reed Bank	"	"
*Seymour, W. A.	Osceola	Osceola
*Vannice, G. A.	Vista	Vista
Watkins, Wm	Osceola	Osceola
Whitaker, J. W.	"	"
Wilson, R. B.	Grinnell, Iowa	Taberville

VERNON COUNTY.

Name of operator or company.	Postoffice.	Mine located near
* Allen, R. E.	Rich Hill.....	Carbon Center.....
Brown, John.....	Moundville.....	Moundville.....
Burks, C. M.	Walker.....	Walker.....
Burton, W. C.	Bronaugh.....	Bronaugh.....
Chaney & Burch.....	Rich Hill.....	Rich Hill (Bates Co.)..
Crawford, C. B.	Walker.....	Walker.....
Devore, J. M.	Moundville.....	Moundville.....
Every, Milton.....	Walker.....	Walker.....
Ferry Coal Bank.....	Milo.....	Milo.....
Finley, A. O.	Ketterman.....	Ketterman.....
Frank, A. H.	Moundville.....	Moundville.....
Gill, J. F.	".....	".....
Gonterman, W. G.	Sheldon.....	Sheldon.....
Greene, E.	Bellamy.....	Bellamy.....
Hightower, J. H.	Walker.....	Walker.....
Hunter Bros.	".....	".....
* Keith & Perry Coal Co.	Kansas City.....	Rich Hill (Bates Co.)..
Kincaid, John.....	Walker.....	Walker.....
Larkin, W. E.	Bronaugh.....	Bronaugh.....
Lucas, J. C.	".....	".....
Mosher, H. G.	Schell City.....	Schell City.....
Meadlin & Porter.....	Walker.....	Walker.....
Moore, John.....	Moundville.....	Moundville.....
Nelson, Dr. E. L.	Walker.....	Walker.....
Prewitt, W. H.	".....	".....
* O'Bryan, W. M.	Carbon Center.....	Carbon Center.....
* Robinson, W. D.	Moundville.....	Moundville.....
* Salsman & Scott.....	Carbon Center.....	Carbon Center.....
Smith, J. N.	".....	".....
Smith, Peter.....	Bronaugh.....	Bronaugh.....
* Williams, Frank & Co.	Rich Hill.....	Arthur.....
Witcher, James.....	Walker.....	Walker.....
Wright, I. D.	".....	".....

* Employing 10 or more men.

GLOSSARY

OF MINING TERMS USED IN MISSOURI.

- After-damp**—The mixture of gases remaining in a mine after an explosion of fire-damp.
- Air**—The current of atmospheric air circulating through and ventilating the workings of a mine.
- Air-shaft**—A shaft used expressly for ventilation.
- Air-stack**—A ventilating chimney.
- Air-way**—Any passage in a mine through which air for ventilating purposes is passed.
- Anemometer**—An instrument used for measuring the velocity of a ventilating current.
- Bearing in**—Undermining.
- Black damp**—Carbonic acid gas= CO_2 . It will not support combustion, or life.
- Blower**—A strong discharge of gas from a fissure.
- Blown-out shot**—A shot that has blown out the tamping without bringing down the coal.
- Bonnet**—A shield or covering over a cage to protect it and the miners from anything falling down the shaft.
- Bottom**—The landing at the bottom of the shaft or slope; the floor, bottom rock or stratum underlying a coal seam.
- Brattice**—A division or partition in a shaft, slope, heading, gangway or other underground working places for providing ventilation.
- Brattice-cloth**—A heavy cloth or canvas, often covered with water-proof material, used in the construction of doors and brattices instead of plank.
- Bridle-chains**—Short chains by which the rope is attached to the cage.
- Buntons**—Timbers placed horizontally across a shaft to carry the cage guides, also to strengthen the shaft timbers.
- Butty**—A partner in a contract for driving or mining; comrade, crony.
- Cage**—A platform on which the mine cars are raised and lowered in mine.
- Car—mine car**—Any car used for the conveyance of coal or mineral in a mine.
- Cap**—A piece of plank used on the top of a prop.
- Cartridge**—Paper or water-proof cylindrical cases filled with gun-powder, forming the charge for blasting.
- Catches, latches or keeps**—Catches or rests, to hold the cage when it is brought to rest at the top, bottom or any intermediate landing; also, stops fitted on a cage to prevent cars from running off.
- Cave-in**—A caving-in of the surface over mine workings.
- C. H₄**—The chemical symbol for fire-damp.
- Charge**—The amount of powder or other explosive used in one blast, or shot.
- Choke-damp**—(See black damp).
- Chute** (also spelled **Shute**)—Any passage through which the coal descends by gravity.
- Clanney lamp**—A safety-lamp invented by Dr. Clanney.
- Clod**—A layer of soft shale or slate, forming a very bad roof over a seam of coal.
- Coal measures**—The carboniferous formation.
- Colliery**—The whole plant, including the mine and all adjuncts.
- Colum pipe**—The pipe through which the water is conveyed from the mine pumps to the surface.
- Creep, or squeeze**—The gradual upheaval of the floor of a mine, due to the weight of the overlying strata.
- Crib**—A structure composed of horizontal frames of timber laid upon one another, or a frame-work built like a log cabin.
- Cribbing**—Timbering a shaft with crib-work, commonly extending from surface to the bottom.
- Cropping out**—Coming to the surface; out-cropping.
- Cross-cut**—A small passage-way driven at right angles to the main heading or entry to connect it with a parallel gangway or air-course.
- Davy lamp**—A safety-lamp invented by Sir Humphry Davy.
- Dead-work**—Work which at the time it is done and of itself produces little or no profit.
- Digging**—Mining operations in coal or other mines.
- Dip**—To slope downward from the surface. The inclination of a stratum of a coal seam.
- Ditch**—The drainage gutter.
- Doors**—Wooden doors fixed in underground roads to prevent the ventilating current from taking a short cut to the up-cast air-way.
- Down-cast**—The opening through which the fresh air is drawn or forced into the mine—the in-take.
- Drift**—A water-level gang-way or entry driven into the seam from the surface.
- Drum**—The revolving cylinder around which the winding rope is coiled.

Dump—1. A pile or heap of ore, coal, slate or rock. (2.) The tippie by which the cars are dumped. (3.) To unload a car by tipping it up.

Entry—Main haulage roads or gangways.

Face, or working face—The place at which the coal is actually being worked away, either in a breast or heading.

Fall—1. A mass of roof or side which has fallen in any part of a mine. (2.) To blast or wedge down coal.

Fan—Centrifugal mechanical ventilator.

Fault—A fracture or disturbance of the stratum breaking the continuity of the seam.

Fire—A word shouted by miners to warn one another when a shot is fired.

Fire-boss—A man whose duty it is to examine the workings for accumulations of explosive gas, etc.

Fire-damp—The explosive gas of coal mines—light carburetted hydrogen; the chemical formula is C H_4 .

Furnace—A large coal fire at or near the bottom of an up-cast shaft for producing a current of air for ventilating the mine.

Gas—Fire-damp.

Goaf or gob—1. A space from which the coal has been worked away and the space more or less filled up. (2.) The refuse or waste left in the mine.

Gob-fire—Spontaneous combustion underground.

Guides—Vertical timbers fastened to the buntons to steady and guide the cage.

Head-gear—The pulley frame erected over a shaft.

Head-house—When the head-frame is housed in, the structure is known by this name.

Heading—A gang-way or entry.

Horse-back—Natural channels, cut or washed away by water, in a coal seam, and filled up with shale and sandstone. Sometimes a bank or ridge of foreign matter in a coal seam.

Incline—A slope, any inclined plane, whether above or below the surface.

Indicator—Any instrument or device for indicating the position of the cage in the shaft.

In-take—The passage through which the fresh air is drawn or forced in a mine.

Keeps—See Catches.

Lagging—Small round timber, slabs or planks, driven in behind the legs and over the collar to prevent pieces of the roof from falling through.

Landing—The top or bottom of a slope, shaft or inclined plane.

Latches—A synonym of switch, applied to the split rail and hinged switches.

Long-wall—A system of working a seam of coal in which the whole of the seam is taken out, leaving no pillars, except sometimes a pillar to support the bottom of shaft.

Loader—One who fills the mine cars at the working place.

Manager—An official who has the daily control and supervision of a mine, both above and below ground.

Manway—A small passage used as a traveling way for the miner.

Motive column—The length of column of air in the down-cast shaft which would be equal in weight to the difference in weight of the air in down-cast and up-cast shaft. The power obtained by furnace ventilation is measured by the difference of the weight of the air in the two shafts.

Mouth—The surface end of a shaft or drift.

Narrow work—Headings, air-courses, gangways, entries, etc.

Natural ventilation—Ventilating a mine without furnace or other artificial means.

Needle—A sharp-pointed metal rod, placed in a bore-hole during the tamping of the charge, to leave on its withdrawal an opening through which the charge can be fired.

Nut coal—Coal that passes through an inch or an inch and one-half screen, and over a half-inch screen.

Out crop—That portion of a vein, bed or any stratum appearing at the surface or occurring immediately beneath the soil.

Out-put—The total product of a mine.

Over-cast—A passage through which the ventilating current is conveyed over an entry or air-course.

Parting—Any thin inter-stratified bed of earthy material.

Pillar—A solid block of coal left to support the roof.

Pillar-and-room—A system of working coal by which solid blocks of coal are left on either side of rooms, entries, etc., to support the roof until the rooms are driven up, after which they are drawn out.

Pitch—Dip or rise of a seam.

Plan—The system on which a mine is worked, as "long-wall," "pillar-and-room," etc.

Propping—The timbering of a mine.

Prospecting—Examining a tract of country in search of minerals.

Pulley—The wheel over which a winding rope passes at the top of the head-gear.

Regulator—A frame with a slide door to regulate the amount of air passing into any part of the workings.

Return air—Air that has passed through the workings.

Rib—The side of a pillar.

Roof—The rock lying above a coal bed or ore vein.

Safety cage—A cage provided with an automatic safety catch.

Safety lamp—A miner's lamp, in which the flame is protected in such a manner that an explosive mixture of air and fire-damp can be detected by the mixture burning inside of the gauze. This warns the miner to extinguish his light, as the mixture is dangerous.

Safety catches—Appliances fitted to cages to make them *safety cages*.

Screen—(1) A mechanical apparatus for separating small from large coals. (2) A cloth brattice or curtain hung across a road in a mine to direct the ventilation.

- Seam**—(1) A bed of coal. (2) A fissure or joint, either empty or filled with foreign matter.
- Shaft**—A vertical pit or hole made through strata, through which the product of the mine is brought to the surface, and through which the ventilation is passed either into or out of the mine.
- Sheave**—A wheel with a grooved circumference, over which a rope is turned, either for the transmission of power or for winding or hauling.
- Shot**—(1) A blast. (2) The firing of a blast. (3) Injured by a blast.
- Shot-lighter or Shot-firer**—A man specially appointed by the manager of the mine to fire off shots.
- Sink**—To excavate, to bore or put down a bore-hole.
- Siphon**—A simple, very effective and economical mode of conveying water in a mine over a hill. It takes the form of an iron pipe, bent like an inverted U; the vertical height between the water and top of hill must not exceed 28 or 30 feet, and the discharge end must be lower than the suction end.
- Slack**—Small coal which will pass through a small screen.
- Slip**—(1) A fault. (2) A smooth joint or crack in seam.
- Slope**—The main engine plane or inclined roadway driven in the seam of coal; worked from the out-crop, up which the whole of the product of the mine is raised by the winding engine.
- Sprag**—(1) A short billet of wood used to lock the wheels of a mine-car in place of a brake. (2) A short wooden prop, set in a slanting position for keeping up the coal while it is being undermined.
- Squeeze**—See Creep.
- Steam coal**—A hard, free-burning, non-caking coal.
- Steam jet**—A system of ventilating a mine by means of a number of jets of steam at high pressure kept constantly blowing off from a series of pipes in the bottom of the up-cast shaft.
- Stopping**—An air-tight wall, built across any passage-way in a mine.
- Strip**—To remove the overlying strata of a bed of mineral and take it out by open work.
- Sump**—A receptacle into which the drainage of a mine flows and from which it is pumped to the surface.
- Sulphur**—Iron pyrites.
- Tamp**—To fill up a bore-hole above the charge with some strongly resistant substance, rammed hard upon the powder.
- Timber**—(1) Prop, bars, collars, laggins, etc., (2) To set or place timbers in a mine.
- Tram-road**—A mine track or railroad.
- Trapper**—A small boy employed underground to open and shut doors during the passage of trips.
- Trouble**—A dislocation or fault; any irregularity in the bed.
- Up-cast**—The shaft through which the return air ascends and is got rid of.
- Vein**—A seam of coal or other mineral.
- Ventilation**—The atmospheric air circulating in a mine.
- Waste**—See goaf.
- Water-gauge**—An instrument for measuring the drag or friction of air in mine.
- Water-level**—An entry or gangway driven very nearly level, for the purpose of draining.
- White damp**—Carbonic oxide, a gas occasionally found in coal mines, generally a product of combustion. Although it will support combustion, and under certain conditions it is inflammable, it quickly destroys life.
- Workings**—The openings of a colliery, including all roads, rooms, headings, entries, etc.

PART SECOND

REPORT ON

LEAD AND ZINC MINES

FOR YEAR ENDING JUNE 30, 1892.

LEAD AND ZINC.

The year just closed (June 30, 1892) has been fruitful in both good and bad results in the lead and zinc-ore field of operations. On the one hand, the good results are noticeable in the largely increased production over the previous year; while on the other hand, the evil results occasioned by the extraordinary rain-fall have not only cut off many thousand tons of ore that would otherwise add so largely to an already heavy increase, but it worked damage to the great majority of operating mines, and greatly interfered with and delayed prospecting as well. Especially has this been the case in Southwest Missouri, where the mines universally suffered from high water and its effects. Numerous instances (as late as October 1892) are reported to us of mines still lying idle from this cause. However, from our statistics and other information gathered since July 1, we find about all the more important mines again at work, with eleven hundred and sixty-one men prospecting, thus indicating the life and activity existing in the lead and zinc-ore camps of the State.

When these enforced delays, necessarily brought about from the cause mentioned, are considered, it is with some astonishment that we are enabled to record an increased production amounting to \$330,458 over the preceding year; with a total product from which was realized the handsome sum of \$5,056,505, which amount represents the value of the lead ore and zinc ore product only, as we have this year eliminated from our tables and estimates the value of the pig-lead product, for reasons heretofore given in this report.

The prevailing customs which obtain in the ownership, lease and operation of lead and zinc-mining properties, may be of interest to some, and for this reason we will briefly outline some of the methods in vogue. Usually the mineral lands which are known or believed to be valuable are owned outright or are leased by companies or individuals. The tendency of late years to consolidation is prevalent in all directions and in all industries, and lead and zinc-mining is no exception. Many large companies are in existence owning or controlling immense bodies (in many instances) of mineral lands, with a seeming

tendency to absorb still more, as the promise of good fields present themselves. Yet there are new companies continually being formed. The companies owning large tracts of land oftentimes set apart or reserve a certain portion of their tracts, and usually supposed to be the most productive, to be used by the company in mining on its own account, while the other portions are leased to still smaller concerns in from ten-acre to forty or more acre tracts; and these in turn lease to miners or individual operators, small pieces of ground or lots, usually 200×200 feet. The small operator securing one of these lots is said to have been given a mining privilege, as it is sometimes called. Sub-operators are charged a royalty of from 10% to 25% of the product mined, usually dependent upon the location of mine, character of the mineral, or other considerations which influence prices.

In a majority of cases the operator owns the plant which is necessary to drain his mine, hoist his ore and clean the same, while others not possessing the plant have their ore cleaned at a neighboring concentrating plant, and yet others, not being able to drain their mines, pay what is known as a pump rent. This pump rent is often a part of the consideration in the amount of royalty charged, which, we understand, is usually equivalent to an extra charge of 5%. The conditions made by some of the companies, and which the small operator is required to sign before he can secure the privilege to mine upon the land, appear hard and severe unless the reasons for the same are thoroughly understood. In the majority of cases the small operator is poor with no responsibility at stake beyond his personal welfare and good character. Should the elements be lacking which constitute the latter qualification, he could occasion a company no end of trouble and annoyance. It is because of the numerous latter individuals encountered which makes necessary the strict requirements and conditions before a privilege to mine can be secured. For a copy of the rules and requirements referred to, see "Mining Rules" of the St. Louis-Aurora Mining Company in this report.

By reference to table No. 12, following this, may be found a summary of general results of lead and zinc-mining during the past year.

It will be found that there are 677 mines, employing 5915 men, producing lead ore to the amount of 49,626 tons, and zinc ore to the amount of 131,488 tons, with total value for lead ore of \$2,194,029.54, and total value for zinc ore of \$2,862,475.08, and a total value for lead and zinc ore of \$5,056,504.62. The average price of lead ore has been \$44.21 per ton, against \$49.10 per ton for preceding year. Zinc ore has averaged \$21.76, against \$21.60 per ton for the preceding year.

TABLE XII—*Summary of General Results for the year ending June 30, 1892, as compared with the year 1891, in Lead and Zinc Mines of the State.*

	1891.	1892.	Increase over 1891.
Number of counties in which lead and zinc are mined	17	14	.....
Number of mines in operation.....	610	677	67
Number of tons zinc ore mined.....	123,752	131,488	7,736
Number of tons lead ore mined	16,925	49,626	.....
*Number of tons pig lead.....	19,968	.....	.....
Average value of zinc ore per ton at mines.....	\$21 60	\$21 76	.....
Average value of lead ore per ton at mines.....	49 10	44 21	.....
*Average value of pig lead per ton at mines.....	79 13	.....	.....
*Total value of zinc ore, lead ore and pig lead	5,084,468	5,056,505	.....
Total number of all employees.....	5,065	5,915	850
Total number of miners	2,397	3,296	899
Total number of other employees	2,668	2,619	.....
Total number of men killed.....	12	18	6
Total number of wives made widows.....	5	8	3
Total number of children made fatherless.....	12	21	9
Total number of non-fatal accidents.....	13	11	.....
Total number of employees for each life lost	422	328	.....
Total number of pumps in use	404	326	.....
Total number of crushers in use	147	172	25
Total number of steam-jigs in use... ..	273	320	47

* Pig lead has not been included in our estimates for this year; only lead ore and zinc ore are estimated on. To make a just and fair comparison between the two years, \$358,416 should be added to the sum total of \$5,056,505, the value of the product of lead ore and zinc ore for this year, making the total \$5,414,921, and showing increase over preceding year from the product of the two minerals of \$330,458. The sum of \$358,416 is the difference between the value of the lead-ore product and that of the pig-lead product, as reported to us by the companies producing both.

BARRY COUNTY.

Production, 84 tons lead ore, 192.50 tons zinc ore.

Mining is being prosecuted in a limited way along Shoal creek in the vicinity of Pioneer and Purdy. Ore was struck at the latter place about one year ago, since which time several thousand pounds of both galena and zinc ores have been produced, and we are informed that the prospect for an increased production during the coming year is good.

PURDY POSTOFFICE.

Columbia Mining company—This property lies about 4 miles east of Purdy. The mine was formerly operated by the Drake Mining Co. But little mining has been done during the past year, but we are informed that the company is now sinking a prospect shaft, which is down 85 feet, calculating to strike a deeper run of ore.

PIONEER POSTOFFICE.

Allen, Stark & Co.—L. L. Allen, of Peirce City, manager. These mines were put in operation about one year ago. They are located on Shoal Creek near Pioneer. Several prospect shafts have been sunk and one drift driven into the hill, but owing to large quantities of water encountered, prospecting has been discontinued. Mr. Stark informs us, however, that the work is only temporarily idle. Zinc blend and silicate are both found.

Ft. Smith Mining and Smelting company—Joseph Jerrick, manager. Mines are located near Pioneer, upon the property of M. E. Northcutt. They were opened about one year ago, but at date of our visit to that section of the State only a few men were employed.

Both lead and silicate of zinc ores are produced; they are found near the surface, none of the shafts exceeding 35 feet in depth.

The machinery for treating the ores consists of crushers, rolls and hand-jigs.

CHRISTIAN COUNTY.

Christian county is among the ore-bearing counties of the State although but little ores, thus far, have been produced in her borders, and that which has been mined was found in the vicinity of Ozark, and worked in a very small way by local operators.

Two companies have been recently organized, backed by English capitalists, and are doing considerable prospecting in the vicinity of

Chadwick. Mr. J. A. Hammond, of Springfield, is manager of both companies.

We made an inspection of the Merino Mining Company's property June 29, 1892, located about 5 miles southeast of Chadwick, in section 8, township 25, range 19, west, and found they were erecting a concentrating plant consisting of crusher, rolls and jigs, and a steam-drill was also in operation. Some lead ore was observed in the bottom of the prospect shaft, but mixed through the rock in such a manner as to require crushing. A short distance up the hill from this plant a prospect shaft was being sunk, which was down 80 feet, and equipped with good hoisting machinery.

Armstrong Mining Company's property is located about 7 miles west of Chadwick; upon which complete dressing works are being erected. We were informed by Mr. Hammond, the manager, that they had struck both lead and zinc ores in paying quantities. The plant was not visited by the writer.

COLE COUNTY.

Production, 35 tons lead ore.

J. D. Woodward—Is operating a small air-furnace for smelting lead ores produced in the surrounding country. It is located about $1\frac{1}{4}$ mile east of Enon Station. The principal ore produced during the past year was mined by A. M. Farmer of Hickory Hill, and F. Fielder of Russellville; although ore has been mined in past years, in a great many different places throughout, not only this county, but Moniteau and Miller counties as well, and the product smelted here.

No deep mining has so far been prosecuted, but the ore is generally found in the clay near the surface, and is usually very rich. Mr. Woodward informed me that he realizes about 72% of pig-lead out of the ore, even at his crude furnace.

DADE COUNTY.

Production, $97\frac{1}{2}$ tons lead ore, $103\frac{1}{2}$ tons zinc ore.

Corry Mining company—F. M. Shoemaker, manager. These mines are located about 10 miles northeast of Greenfield, and were locally noted a few years ago as large producers. The ore was usually found in the clay near the surface, but few shafts were sunk exceeding 35 feet in depth. At date of our visit (July 1892) to this section of the State,

we were notified that the mines were idle, and had been since March; hence, no inspection was necessary.

Pemberton Mines—Operated by Allen & Hughes. This property is located about 8 miles northwest of Greenfield. The ore is found in the clay near the surface. The mines have only been operated in a limited way during the past year, caused by the depression in the market for this class of ore—silicate of zinc—but we were informed that during the spring considerable quantities of this class of ore had been shipped to Wisconsin. The opening of this new market has somewhat increased the value of the product.

The principal part of the ore is mined by farmers and farm laborers when not employed in the fields; hence, at date of our visit (July 1892), only a limited force was at work at the mines. E. R. Hughes is manager.

Southwest Mining company—A. F. Nixon, manager. This company has leases on several hundred acres of land lying from 6 to 8 miles northeast of Everton Station. The ore, like other mines in the county, is found near the surface, and is worked by farmers and farm-hands during fall and winter. But little mining has been done during the past year.

FRANKLIN COUNTY.

Production, 150 tons lead ore.

J. H. Bartle—Is operating an air-furnace for the purpose of smelting the lead ore produced in the vicinity of St. Clair, at which place the furnace is located. The ore was mined by so many different parties and in such small quantities, that it would have been a very hard matter to have secured the output from the producers; therefore, we thought best to get the product through Mr. Bartle, who has kindly furnished it.

The more important operators are as follows: John Harmon, Clark & Martin, of Red Hill; John Crow, Mr. Simpson, Mr. Moselle and O. Thurman. The ore is found in cubes, and is a good grade of galena, worth about \$21 per thousand pounds.

GREENE COUNTY.

Product, 406.11 tons lead ore; 898.60 tons zinc ore.

BROOKLINE STATION.

Nixon & Holman—Are operating mines located at Brookline Station, on the Frisco railway. The ores are found near the surface, the principal part of which is silicate of zinc, although some galena is produced. At this date two shafts are in operation, each of which is about 15 feet in depth.

In 1876 a small smelter was erected here and considerable surface mineral (lead ore) smelted, but after a few years' operation it was abandoned, and the mines have been idle ever since, until these gentlemen took charge a little over a year ago.

Mr. A. F. Nixon, the manager, informs us that the price of silicate of zinc has been increased during the spring and summer, due to additional markets being opened in Wisconsin.

ASH GROVE POSTOFFICE.

Bay State Lead and Zinc company—Allen Hardy, of Webb City, manager. Mine located about two miles south of Ash Grove, on the McCord land. The mines were operated last year under the name of Dunlap & Co.

A steam hoister has been erected at the only shaft in operation upon the property. The shaft is 5x7 feet in the clear and about 200 feet north of the old Dunlap mine, which was such a large producer in 1889. The output during the past year has been light.

J. K. P. Duncan—Mine has not been in operation during the past year.

Goetz Mining company—Robert Bray, superintendent. This property is located about $1\frac{1}{2}$ mile southeast of Ash Grove. The galena, which is the principal product, is found in the clay near the surface. So far, no deep mining has been done, and the output during the past year has been small.

Murray & North—Mines are located about $1\frac{1}{2}$ miles south of Ash Grove. The Simmons & Gillian shaft is the only one producing ore upon the property at date of inspection (July 2, 1892). Several others have contributed to the output during the past year, but are idle at this date, due to the recent heavy rains.

Both lead ore and silicate of zinc are found, the lead largely predominating.

The ore now being worked is found at a depth of 80 feet, although much of the ores produced during the past few years were found in the clay near the surface.

A company known as the Pennsylvania Mining Company sunk a shaft on the Maurer land, adjoining Ash Grove on the east, to a depth of 235 feet, and Mr. Hurt, superintendent, informed us that galena was encountered, in small quantities at 125 and 175 feet, and that the shaft was in ore when it was stopped. He also stated that a steam-pump would be erected in order to beat the water, and enable them to resume operation as soon as practicable.

A number of local operators and farmers in Greene, Lawrence and Dade counties have mined small quantities of lead ore in this vicinity, and sold the same to Mr. E. A. Hurt, to whom we are under obligations for the report of same. Not knowing the names of all the parties nor the amount each produced, we have reported the output in the statistical table under the name of Mr. Hurt.

MUMFORD POSTOFFICE.

Ananias Mining company—Mines are located at Mumford, on the James river. These are the mines that were operated by J. A. Eaton & Co. last year. They were being operated by Messrs. Plank and Tut-hill at date of our visit. The ore is good, commanding the top market price.

Gumbo Mining company—Mines located about 8 miles southeast of Springfield, on Pearson creek. This is by far the largest producer in the county—both lead and zinc ore being found, and each regarded as a high grade ore.

The shaft is sunk on the creek bank and tunnels have been driven out under the creek bed; and as the shaft is only about 34 feet deep, the water finds it way through the overlying strata into the mine, which causes a great deal of trouble.

The report of the output from the mines during the past year shows 600 tons of zinc ore, valued at \$25.00 per ton, and 145 tons of lead ore valued at \$47.00 per ton, making a total value of \$21,815 for both lead and zinc.

JASPER COUNTY.

This county although more generally affected by the heavy rains of the spring than that of any other section of the State comes to the front at the end of another year with most surprising results, produc-

ing as may be seen from this report 23% of the entire output of lead ore mined in the State and over 80% of the entire zinc ore product. There are in the county 437 mines producing, of

Lead ore, tons.....	11,501
Zinc ore, tons.....	106,014
Employing men.....	3,624
Value of its lead ore.....	\$530,093
Value of zinc ore.....	2,416,383
Grand total.....	\$2,946,477

The average price received per ton for lead ore has been \$46.09 as against \$48.93 for the preceding year, while the average price received for zinc per ton has been \$22.79 as against \$23.28 for the preceding year. From which it will be seen that there has been a decrease this year from that of the preceding in lead ore of \$1.84 per ton and in zinc ore of 49 cents per ton.

Following may be found a brief account of the numerous mines of the county with reference to location of mines, equipments, employes, output of same, etc., etc.:

ALBA POSTOFFICE.

Alba company—The property of this company is located three-fourths of a mile west of Alba. It has a strip-pit 58 feet deep, 30 feet wide at the bottom, 82 feet wide at the top and 209 feet long. There is one prospecting shaft, with a depth of 150 feet, and eleven others varying in depth from 20 to 100 feet. The plant for cleaning the ore is constructed after the German principle, costing about \$18,000. At date of our inspection, October 13, 1892, the mines were idle, but we understood operations would be resumed shortly.

Alba Mining company—W. M. Stealey, superintendent. Mines are located at Alba. At date of our inspection, October 13, 1892, we found 45 men employed, and learned that about 70 tons per week of zinc ore were being produced. The superintendent informed me that only four shafts had been sunk, and that in each good ore had been found at a depth of 150 feet. The plant is as follows:

Three boilers, aggregating 180 horse-power; 3 steam pumps; 1 set of steam jigs, crushers and rolls. The shaft is connected with a second opening, which is also equipped with a steam hoister. The mines make considerable water, which is hoisted to a large tank by two lift-pumps,

from which it is again pumped to the surface by a large Worthington pump, having a 9-inch discharge.

CARL JUNCTION POSTOFFICE.

A. Knight, proprietor and operator—mine located at Carl Junction, on a tract of land embracing 340 acres. We understand that a shaft has been sunk to a depth of 120 feet, striking good ore, which was worked some four months, then closed down to await further developments in other directions.

Wauchussetts Mining company—Mine located near Carl Junction, with shaft 110 feet in depth. Only prospecting, so far, has been carried on, the company claiming the same to be very promising. At the time of our visit no sales of ore had been made.

CARTHAGE POSTOFFICE.

Carthage Mining company—H. N. Cornell, manager. Mine located at Edwin Station. The mine was flooded with water last June, and was idle October 12, 1892, at the time our information was obtained concerning it. The manager informed us that it was the intention of the company to resume operations in the near future.

Myers & Jemmison—Mine located near the Missouri Pacific depot at Carthage. Shaft 150 feet in depth, producing zinc ore only, and employing 30 men. At the time of our visit, we learned that shaft had been sunk deeper, and a much larger body of ore struck than heretofore encountered.

Pacific Mining company—Wm. B. Myers, superintendent. Mines located near the Missouri Pacific depot at Carthage. Shafts average 160 feet in depth, producing zinc ore only. Fifteen men are employed. The mines produce a high grade of zinc ore, the price averaging \$26 per ton during the past year.

Porter Mining company—J. W. Kerr, agent. Mines located near the Missouri Pacific depot at Carthage. Mines were idle at the date of our visit, and had been for some time prior thereto. Our information is limited, due to the above.

For output, etc., see accompanying tables.

JOPLIN POSTOFFICE.

American Bull Pup Mining company—The property of this company embraces a 40-acre lease of the Phelps land, north of Joplin and adjoining the Granby land. Two mines are in operation, with shafts of an average depth of 112 feet. Two boilers, two pumps and twenty-one men are employed. The prospect is said to be promising.

Barbee Mining company—This mine is located 2 miles southeast of Joplin on the 80-acre tract of Barbee, Briggs & Connor land. It is a new shaft with a new pumping plant. No ore was produced up to June 30, 1892, but at date of collecting our statistics the prospects were very encouraging.

Byers, Murphy & Conner—Mines are located northwest of the city limits of Joplin. Two mines have been operated on this property. Shafts have an average depth of 100 feet. The plant consists of two boilers and four pumps. So far the product of the mines has been quite small. At the time of our visit the mines were idle.

Cave Springs Mining company—Mr. Brinkerhoff is president, P. Phenning superintendent. This company owns 80 acres of land 1½ mile from Galena on the State line between Missouri and Kansas. There are seven producing mines on the property, employing 30 men. New steam-boiler, sheds and engine-houses have been erected; also three steam-pumps and one crusher recently rebuilt. Shafts have an average depth of 60 feet. Thirty miners are employed. Phenning & Bloker have a sub-lease of seven lots and a plant capacity of 75 tons per shift. Mines shut down since December on account of high water.

Cora Latta Land and Mining company—George B. Paxton agent. The two mines now being operated are on property adjoining College Hill on the south, in the eastern part of the city of Joplin. The shafts have an average depth of 83 feet. These mines were formerly worked by Spring, Moore and Davis. The improvements during the past year have been the erection of pump and steam hoister and installation of steam engine and boiler.

Engineers' Mining company—The two mines now operated are located on the old Baker land between Joplin and Webb City. Shafts 55 and 180 feet deep respectively. Heavy rains in the spring caused a suspension of work for some time, but operations are now resumed.

Empire Zinc company—W. C. Wetherell general manager, Pope Yeatman superintendent. The property of this company is located in the vicinity of Joplin, the larger portion of which however is within the city limits. This company ranks fourth in Jasper county in amount of production. The land is divided into three minning camps, the first of which, and known as the Eagle mines is located in sections 15, and 16, T 27, R 33, and contains 200 acres. This tract is the most productive piece of land belonging to the company. Located here is one of the largest concentrating plants in this section of the State, consisting of crushers rolls, steam-jigs etc. It is said that the work here is so thorough that not a particle of ore is lost.

The pumping is done principally by the string system, the engines at the main plant running the strings. There is also an engine at the main plant which drives the rope transmission, by which most of the ore in the company's mines is hoisted. The company does most of the mining on this land. Among the principal sub-operators in this camp we mention The Little Daisy, or Electric Mining Co, of St. Louis; Capt. Hennessey, general manager, the plant of which consists of a boiler, engine, one complete set of steam-jigs, with three electric motors running the hoisters and some of the machinery. Thirteen men are employed on each shift.

E. O. Chase has a plant consisting of boiler, engine, pump, etc., and a very good mine.

J. H. Brundridge is operating a mine in this camp.

Koh-i-noor tract or camp lies in the city limits of Joplin, and the zinc smelter of the company is located on the land adjoining. It has four pumps, one complete concentrating plant, first-class in every respect. The ore on this tract is pronounced very fine, and is found at depths varying from 140 to 170 feet.

The Gray Land or Camp—This is a small strip of land adjoining the Koh-i-noor on the east, and leased from a Mr. Gray of St. Louis. This portion of the company's property is leased in 200-foot lots to miners. Belas & Co. have the principal mine in this camp.

The Empire Zinc Co. has made the following improvements during the past year, and which is somewhat of an innovation: It has introduced electric motors for hoisting, pumping and the crushing of ores, also electric lights for underground work.

This company gives employment to 170 men, and at date of our inspection 65 men were prospecting on its property.

Euclid Mining company—Thomas Ward, president, M. M. Oviatt, superintendent. The mines are located east of the Kansas and Missouri State line, and is a lease of the Ferguson land.

There are 4 shafts on the property with an average depth of 75 feet, two of which are producing ore, while the remaining two were at the time of our visit as yet prospect. The mines shut down February 1, 1892. The plant is first-class and in good condition. The machinery is of the latest and most improved pattern.

Granby Mining and Smelting company—J. H. Stephens, superintendent. The mines of this company are located northwest of Joplin, and partly within the city limits of the same. There are 30 mines, 10 steam boilers, five steam pumps and 140 men employed. And in addition to this there were, at the time our information was gathered, 20

men prospecting. Mining privileges are granted to miners who operate the greatest number of the mines. The principal ore-producing mines are located in what are known as "Opossum Hollow" and "Poor Man's Gulch." Among the largest producers we mention G. B. Webster & Co., Gentry & Co., Blue Ribbon, S. J. Frye & Co., C. W. Lyon & Co., Bridges & Co., Phillips & Co. and Lowery & Co.

Great Western Mining company—Robert Rees, superintendent. Mine located three miles east of Joplin. One mine with a shaft 90 feet in depth is operated, employing 11 men. The plant consists of one boiler, one pump and one crusher. For output and other information, see tables accompanying this report.

Guengerich, Kelley & Gregg—These mines are located in what is known "Cottonwood Hollow," northwest of Joplin, and midway between the latter and Zincite. There are at present three mines producing ore, with average depth of shaft of 140 feet. Hand-jigs are used, and 17 men employed.

Guinn & Loyd—R. C. Friend superintendent. Mines located about one mile south of Joplin on the O'Keefe lands. These mines are sometimes called the Loyd & Logan mines. When running, two mines are operated, employing about 18 men. Two steam boilers, two steam pumps, crushers and steam-jigs make up the plant. The mines produce a large amount of both lead and zinc ores. The showing for the past year, which is very good, would have been largely increased but for the heavy spring rains; then following this occurred the death of Mr. Loyd. At date of inspection the mines were still idle.

Hicks & Co.—Operate two mines, located on town lots in the Mitchell addition to South Joplin. The shafts have an average depth of 50 feet. A new shaft was sunk and pump put in during the past year.

Home Mining company—S. H. Claycomb superintendent. The mines of this company, two in number, are located on a 40-acre lease of the O'Keefe lands, in the southern city limits of Joplin. Average depth of the shaft is 60 feet. The spring rains caused great delay; but at the time of our visit work was resumed and progressing satisfactorily.

Jasper & LaReine Lead and Zinc company—H. Tucher, superintendent. There are five producing mines on this property, located at Joplin on North Turkey creek. Sixty men are employed in and about the mines, while some 16 others are engaged prospecting. The following companies or operators are at work on this land: Big Run Mining Co. (Williams & Hamill), and the Little Nellie Mining Co., operating

three mines. The milling company furnishes the power, running the hoisters by rope transmission and the pumps by the string system. Knowles & Hay and Warren Bros. & Co. also operate mines on this property. The most important improvement made during the past year has been the erection, by English capital, of a new milling plant, and known as the Joplin Milling Co., limited. It is a custom mill of a capacity of 100 tons per day, or 50 tons for each shift—having a complete steam-jig concentrating plant. It is said to be doing good work in saving a high percentage of ore and the extraction of mundic from the blende. The combined power of its two engines equals 120 horse-power, with three boilers of 70 horse-power each. The mill is supplying power for pumping and hoisting by rope transmission to the adjacent mines. It is conveniently located for shipping the mineral.

Joplin Syndicate, Limited—C. O. Frye, superintendent. One mine is being operated. It is located in Cotton wood Hollow, and employs 26 men. The shaft is 90 feet deep. This is a new mine; operations commenced in February last, and the prospect is said to be good.

McCoy & company—Grant McCoy, superintendent. The mines are located in the northwest city limits of Joplin, and embraced in 40-acre lease of the W. H. Phelps land. Four mines are producing ore, and 58 men are employed; shafts have an average depth of 110 feet. The principal operators on the property are Brewer Bros. & Co., employing 20 men; J. M. Lee & Co., employing 18 men. Freeman & Baker have just opened a mine. The prospect at each of the above named is said to be very good.

Mahaska Mines—Rice & James, proprietors. Mines are located partly within the city limits of Joplin. This firm has a lease of 160 acres of land owned by Dr. Carter, of Carthage. Five years ago Messrs. Rice & James secured a lease of this property, and have steadily developed it to its present good standing. Privileges (as they are sometimes called) are granted to miners, who pay a royalty of 20% of the ore produced. At the time of our inspection many of the mines were idle on account of water preventing work. There are 23 producing mines on this property, employing, when running, 103 men. When our statistics were gathered, 62 men were prospecting. Steam jigs and building, also one set of rolls, were added to the plant during the past year. The pumping and hoisting at some of the mines is done by electric motors, the latter being furnished by the Electric Light and Power Co. The force is generated at Grand Falls, three miles distant from the mines.

Midland Mining company—W. H. Highman, president, John Wakenshaw, superintendent. The mines are located east of the Kansas line on a 36-acre lease of the Ferguson land. When running, seven shafts are operated, having an average depth of 35 feet, and employing 26 men, producing zinc ore only. At the time of our visit the mines were shut down on account of inadequate ventilation. The company expected, however, to resume operations in a few days with a full force.

Monkey Hill—J. S. Casey, proprietor. The mines are located $3\frac{1}{2}$ miles southwest of Joplin, on property leased from the Roaring Springs Land Co. Three mines, with shafts of an average depth of 75 feet, produce zinc ore. Since the water has been gotten rid of, the mines are again doing well. The opening up of a new shaft, the building of a trestle to the concentrating plants, and the putting in of a large steam-pump for draining, constitute the improvements for the past year.

Moonshine Mining company—W. S. Paul, secretary. The mines of this company are located in the east city limits of Joplin. Ten mines, with shafts of an average depth of 70 feet, produce both lead and zinc ores, and employ when running 50 men. At the time of our visit to the mines we found them being opened up again, after having been idle for some time. The pumps are on the string system, and operated by an engine located at the main plant. During the year a new jig-plant has been erected, and several new mines opened up.

Nellie Bly Zinc Mining company—The mine is located just south of the city limits of Joplin, and is the mine formerly operated by and under the name of the Modoc Mining Co. During the past year one pump for draining purposes and one steam hoister had been erected; but at the time of our visit the mine was shut down and the machinery was being removed.

North Joplin Land company—The mines of this company adjoin the city of Joplin on the north. At the time of our inspection but little work was being done aside from the prospecting above the water.

North Heights Mining company—The two mines of this company are located in the city limits of Joplin. The property was purchased from the Granby Land Co. Two shafts of an average depth of 65 feet are operated, and 14 men employed.

Oswego Mining company—S. C. Cooke general manager. The mines of the company are now principally within the city limits of Joplin. The company owns several hundred acres of land, and its mines have been very productive. It is claimed that the spar formation in which the ore on this land is found reduces the cost of cleaning. There are

eight producing mines on the property, furnishing employment to 65 men; and there were, at the time of our visit, 20 men prospecting. A large amount of both lead and zinc ores are produced. When we visited the mines we found that the company was just recovering from the effects of the spring rains, and as a result its complement of men was not employed. The pumps are worked partly on the string system and partly by steam direct—the string pumps being operated by one main plant. One full steam plant and two pumps have been added to the equipment during the past year.

Pincard Mines—These mines are located $2\frac{1}{2}$ miles east of Joplin on the Wm. Leckie land. Two mines, when operated, produce both lead and zinc ores, giving employment to 11 men. At the time of our visit very little work was being done.

E. D. Porter Land—The mines on this land are located within the city limits of Joplin. From 8 to 10 mines have been operated, giving employment to 32 men when running. At the time of our inspection no other work than that of scrapping in the shallow ground was being performed, and the plant was being torn down and removed.

Rex Mining and Smelting company—E. D. Porter, general manager. This company is operating a tract of land lying $1\frac{1}{2}$ mile southeast of the city limits of Joplin, and heretofore known as the "1000-acre tract." The present company commenced work on this tract a little over one year ago, and it is now considered by some parties as the most promising property in the district, as new strikes are of frequent occurrence, with, it is claimed, 25 paying mines in operation and 30 shafts additional in process of sinking to the ore level. The leading operators or companies upon this land are: Crossman & Co., working three shafts and employing 27 men. The ore from the three shafts is run on elevated tracks to the crusher room, thence through this plant into the clean ore bin, where it is ready for market. Two pumps are used to drain the mine. Connection with the K. C., Ft. S. & G. R. R. is made by a branch road.

There are also operating on the 20-acre sub-lease of Crossman & Co., Messrs. McIntyre & McKee, who work two shafts and employ 37 men; the Axtell Mining Co., employing 15 men; the Bell Boy Co., usually employing about 16 men, but at present operations temporarily suspended while putting in a new concentrating plant; the Rodgers Mining Co., operating a mine employing six men; the Lucretia Mining Co., operating a mine on a lot in the "Rex Reserve," and employing 12 men.

The Rex Reserve is a portion of the tract set apart for the exclusive operation by the Rex Co. proper, although a few small lots have been leased to individual miners.

Stilwell & Gregory have a 40-acre lease from the Rex Mining Co. The principal operators on this lease are Stilwell, Gregory & Porter, who have a shaft 80 feet in depth, and employ 26 men. On this same lot is a custom crusher with rolls, etc.

Randall & Co. operate a mine, and employ 7 men.

Moore & Co. employ 6 men.

Rush & Son employ 7 men.

Bishop & Co. employ 9 men.

A branch of the K. C., Ft. S. & G. R. R. runs through the lease, furnishing good shipping facilities.

The American Mining Co., F. M. Sharp, proprietor and general manager, has a 40-acre lease from the Rex Mining Co., and operates four mines, having shafts 52, 75, 106 and 120 feet in depth, respectively, with all the necessary plant for operating and draining the mines, and a first-class concentrating plant, embracing crushers, rolls, revolving screens, etc., with a branch road of the K. C., Ft. S. & G. R. R. running up to the works.

Kellar & Co. have a mine on this lease.

The Columbia Mining Co. has a lease of 40 acres from the Rex Co., and a good pumping plant for draining. It was driving away for the main ore body at the time of our visit.

The remaining companies having leases from the Rex are as follows:

The Ohio Mining Co.....	40 acres.
Rich Hill Mining Co.....	20 "
Continental Mining Co.....	40 "
Fresh Water Mining Co.....	40 "
Boga Mining Co.....	40 "
Gotham Mining Co.....	20 "
D. C. McConey Mining Co.....	40 "
World's Fair Mining Co..	40 "
Miami Mining Co.....	40 "
Bishop Mining Co.	20 "

Ruby Lead and Zinc company—J. B. McGraw, superintendent. Mines located due south of Joplin, near the county line. The com-

pany has an extra good plant, but the mines have been idle for some time. No ore was produced during the past year; yet at the time of our inspection, work was resumed and a good face of ore developed in three shafts.

J. B. Sergeant—Mines located in the west city limits of Joplin, on the Gray land.

There are two shafts at present producing lead and zinc ores, with an average depth of 75 feet. Clemens & Pack are operating one shaft and Capt. Barnes the other. Very little was accomplished in the year just closed.

Schrader & Doherty Lead and Zinc Mining company—Mines located near Blendville in the Joplin district. This company succeeds the Diamond Lead and Zinc Mining Company, which operated the mines during the past year, and to it is due the output as shown in our tables. The present company took control about July 1, and had up to the time of our collecting statistics for the past year's business, spent several thousand dollars in improvements. The present owners feel satisfied the property will in a short time develop as good results as heretofore attained.

King & Co are mining on one lot employing 6 men.

A. Hudson has a fraction of two lots on which he is at work with six men. Several new shafts are being sunk, with favorable prospects.

Snyder Bros. Mining and Smelting company—The mines of this company are located two miles south of Joplin proper, with five shafts in operation of an average depth of 75 feet, employing 45 men and producing both lead and zinc ores. The company proper has been doing during the past year most of the work, as some of its sub-leased mines are in litigation. This property consists of a 20-acre lease, which adjoins the Empire Mining Company, equipped with good steam plant, and produces a large amount of mineral, as may be seen from the tables showing output of mines.

Sophie I. Mining company—S. E. Locke, Secretary. These mines were formerly operated by the Thacker Co., and are located on the Thacker land about 1 mile north of Joplin. At the time of our visit five mines were being operated, with shafts of an average depth of 70 feet, and employing 18 men. The equipment is good and the pumps operated on the string system, by an engine located at the main plant. Both lead and zinc ores are produced.

South Joplin Lead and Zinc company—The mines of this company are located in the southern city limits of Joplin. At the time of our

visit, three shafts of an average depth of 140 feet were being operated, 22 men employed, and both lead and zinc ores being produced. The plant embraces 5 boilers, 5 pumps, 2 crushers and 2 sets of jigs. The two concentrating plants are temporarily shut down to allow for improvements in new shaft from which the ore is to be run to the crushers. A new pump has been placed in the new shaft, and drifting was to be commenced as soon as the necessary preparations would permit.

W. B. Jeffries & Co. have a lease on four lots in the south part of this property; they have one shaft down to ore and the necessary plant to drain and operate the mine.

Sterling Lead and Zinc company—Its mines are located in the north-west city limits of Joplin. Four shafts of an average depth of 100 feet have been operated, employing 35 men. At the time of our visit the mines were shut down, and the only work being done was by scappers on the waste-dumps.

Swarland Mining company—P. L. Swartz, proprietor and manager. The mines are located on Turkey creek, north of the Sophie I. Mining Co. There are four producing mines when operated, employing 32 men. At the time of our visit work was resumed, after having been idle on account of overflow from the creek.

Tuckahoe Mining company—Joseph Peel, superintendent. The mines are located about 3 miles north of Joplin, on an 80-acre lease of the Loyd & Spencer land. The present company, during the past year, has added a complete new plant, consisting of boilers, engines, crushers and rolls. Eleven mines, with shafts having an average depth of 110 feet, employ on an average the year round 26 men.

The following parties are operating mines on this land:

Donan & Loyd, employing 16 men; Isabel & Co., employing 8 men; Lawrence & Co., employing 3 men. Considerable prospecting was being done at the time of our visit. The water from the spring rains, which had greatly retarded work here, was being pumped out, and it is expected that the mines will shortly reach the old-time output. The ore from this mine, it is said, brings the highest market price.

Turkey Creek Mining company—These mines were leased to E. R. Moffett, jr., last January, since which time they have been operated by him. They are located on Turkey creek, north of the city limits of Joplin. Both lead and zinc ores are produced, and 84 men employed when running full force, the average depth of shafts being about 94 feet. At the time of our visit but little work was being done, on account of high water. Farnham & Holmes and Moffett & Co., who are operating on

this property, were getting ready to resume work. The plant of the Turkey Creek Co. consists of eight boilers, nine pumps, six crushers and four jig plants.

Viroqua Mines—Mine is located four miles east of Joplin. The shaft is 110 feet deep, and when operated employs about 10 men. At the time of our visit the mine was shut down, and only scrapping was being done.

Windsor Mining company—The mines of this company are located within the city limits of Joplin. The following are the principal operators on this land: Little Jersey Mine has a lease of four lots, one shaft in operation, with plant necessary to operate the mine and clean the ore, and employing four men.

Hanover Mining company has a lease on 4 lots, operate one shaft, with equipments necessary to drain, hoist and clean the ore, and employs 6 men.

Enterprise Mining Co. has a lease of four lots; it operate two shafts employing 12 men, and equipped with machinery necessary to operate the mines and clean the ore.

Zinc Hill Mining company—W. E. Goff, general manager. These mines are located $2\frac{1}{2}$ miles north of Joplin. Five mines, with shafts of an average depth of 128 feet, are operated, employing 25 men, and producing both lead and zinc ores. During the past year four new shafts have been sunk. A sale and transfer was made August 6, 1892. of the lease of this company, comprising 20 acres, to an English syndicate, represented by W. B. Jeffrey; since which time there has been added a lease of 40 acres, and extensive pumps and machinery, it is claimed, will at once be added.

LEHIGH POSTOFFICE.

Franklin Zinc company—Mines located at Lehigh, on Center creek. There are 15 mines on the property, 10 steam boilers, 9 steam pumps, 2 crushers and 2 sets of steam-jigs, employing about 100 men when running, and producing zinc ore exclusively. At the time of our visit water was being pumped from the mines, which had been flooded by the spring rains. The company estimates that only about 6 months' work was performed during the past year.

ORONOGO POSTOFFICE.

Granby Mining and Smelting company—Mines located at Oronogo. There are 20 mines on this property, with shafts having an average depth of 60 feet, employing about 100 men, and producing both lead

and zinc ores in considerable quantity. This company owns a large body of land, and leases are made to companies and individual operators.

The Myers Mining company operates what was known as the "Needmoreland" on this tract. It has 8 producing mines and employs about 40 men. Other leases have been made to the following: Kerr & Spencer, Dillendender & Co., James Gammon, Stultz & Co. and H Ayers.

The Circle Mining Co. operates what is known on this land as the "Circle." It has a complete plant and employs about 30 men. There are a number of men working on other parts of the property who make small "turn ins."

Margerum Mining company—G. Ashcraft, superintendent. The mines of this company are located within the city limits of Oronogo. Mining operations on this property commenced during the month of September, 1891. The spring rains greatly interfere with and retard operations; but at the time of our visit work was again progressing in a satisfactory manner. This property has been considered a good lead producer. There are about 50 lessees' shafts on this land, some of which are as yet prospecting, ranging in depth from 18 to 60 feet. It is hoped by parties interested that a good body of zinc ore may be developed under the lead run now being operated, which often occurs in this part of the State.

Messrs. Ashcraft, Hendrickson & Co. are operating the mine at present, producing ore.

WEBB CITY AND CARTERVILLE POSTOFFICE.

All Gall Mining company—Samuel B. Wills, superintendent. Mine located on a town lot in Webb City. Shaft 100 feet in depth, producing both lead and zinc ores, and employing about six men. During the year hand-jigs, horse-hoister, tracks, etc., have been added.

Ashcraft, Reynolds & company—Mines located just north of the limits of Webb City. When running four mines are operated, employing about 15 men. The mines have been idle for some time, and were so found when we visited them.

Center Creek Mining company—The mines of this company are located in Webb City, and produce a larger amount of ore than any company in the county. It controls a large body of very fine mineral land, and its plant is most complete, especially that of the pumping department. Two large engines, either of which is capable of running the 10 pumps, constitute a part of its equipment; however, only one of

them is employed at any one time—the object being to have one in reserve in the event of an engine getting out of order, and thus avoiding delay, which would otherwise result. This company has also a very complete concentrating plant, which is run in connection with the mines. The principal sub-operators are as follows:

Ford & Owen employ 15 men and have a complete plant.

Arnold & Co. employ 12 men and have a complete plant.

Beasley & Co. employ 15 men and have a complete plant.

Hood & Pyle employ 12 men and have a complete plant.

Haynes & Co. employ 12 men and have one plant of crushers, rolls and jigs.

Allen & Co. employ 12 men and have one plant.

Columbia & White have a complete plant and employ 13 men.

The mines known as “Quick Work” adjoin Webb City on the south, and are operated by the Center Creek Co., employing 45 men. The large output of this company, as may be seen by reference to our tables, would doubtless have been very much larger had not the heavy spring rains so seriously interrupted the work in its mines.

Cherokee Mines—Fred Herold proprietor. This is a new mine located at Cartersville, on the Connor 40 acres; one mine having a shaft 214 feet in depth, is being operated, and employs thirty men. The plant is considered a fine one. The first sale of ore was made in July of this year.

Chatham Mining company—Successors to the Tracy Lead and Zinc Mining Company. The change of ownership and in the name of the company occurred April 1 1892.

The mines are located at Webb City and Cartersville. This company is one of the largest producers in the county, ranking third in the value of output. At date of our inspection there were 27 mines in operation, with shafts averaging 150 feet in depth, employing 313 men. In addition to this, there were 56 men prospecting upon the company's land. There has been added during the year in the way of improvement, one new pumping plant.

The principal operators on this property are as follows:

The Morning Star Mining Company operates one mine with shaft 200 feet deep, employing 18 men per shift. It has one engine, two boilers and a complete concentrating plant.

The Tracy plant operates one mine with shaft 185 feet in depth, employing 15 hands per shift. It has a complete concentrating plant.

Dayton Mining Co. operates a mine with shaft 185 feet deep, employing 20 men per shift. It has a complete plant also.

Delph & Dogan have an engine, boiler and crusher, and employ 14 men. Shaft 185 feet in depth.

Martin & Co. have a complete plant and employ 14 men per shift.

Blanton & Wyatt have a complete plant and employ 12 men per shift.

Strong & Connor, shaft 145 feet deep, employ 24 men (two shifts) and have a complete plant.

Leary & Cann have an engine, boiler and steam hoister; shaft 186 feet deep and employ 12 men.

Price & Co. (Bunco Mine) have an engine, boiler, steam hoister, and employ 11 men; shaft 175 feet deep.

Blackwell & Rudy operate mine with shaft 186 feet deep, employing 10 men. They have an engine, boiler and steam hoister.

Lichtliter & Co. have a concentrating plant, and employ 13 men.

Daugherty & Davey—Mines located on the Ealer land at Carterville. The company has at its main plant one pump for drainage, pumping water from a depth of 224 feet, and 3 for pumping water used in washing ore. It has also a string system extending to the Cornfield mines, to run pumps on that property. There is at present only one plant of steam-jigs running on this land, as the large plant of the Oasis burned down and has not as yet been rebuilt. The Oasis Co. have 4 mines on this property, employing 10 men. Each shaft it is claimed is in good ore. But one shaft will be operated until its plant is rebuilt.

Hardin & Henderson are operating a mine, and employ 10 men.

Spencer & Co have a mine on this land, but at present are doing nothing. They, however, expect to resume operations in a short time.

Daugherty, Davey & Daugherty—This firm operates what is known as the "Cornfield mines," located at Carterville. The mines are steadily producing ore, and are drained principally by string pumps operated at the main plant of Daugherty & Davey, located on the Ealer land adjoining this property. There are two complete plants on this property, each consisting of crushers, rolls and steam jigs, one of which is owned by the Elliott company, of Zanesville, Ohio, at which 20 men are employed, and the other one is owned by J. W. Freeman, of Joplin, with 20 men employed.

The other operators on this land are: Luke & Burlingame, employing 10 men; Zetner & Lutz, employing 10 men; Daugherty, Davis & Co., employing 9 men; Zogg & Co., employing 6 men.

The average depth of shafts is about 150 feet.

Davey, Tower & Co.—Mines are located at Carterville, and were formerly known as the South Carterville Mining Co. At date of our visit, the mines were not entirely free from the effects of the spring rains. Work was not attempted in the deeper ore, which has greatly

lessened the amount of mineral, which would otherwise have been produced on this property.

There are two plants on this land doing custom work and cleaning tailings.

J. M. Stamp has a custom crusher which prepares the rough stuff from the mines for the jigs.

Boydson & Johnson have a plant consisting of crusher, rolls and jigs, which was at the time we visited the mines running on tailings that had been left from hand-jigs, with fair results.

Poundstone & Sons have a complete plant, consisting of crusher, rolls and steam-jigs.

Hafford & Co. operate a mine, have a steam hoister and employ 11 men.

Eleventh Hour Mining company—H. H. Ayler, secretary. The mines of this company are located at Carterville. The increased production of this company during the past year reaches astonishing proportions. For the year ending June 30, 1891, the total production of the mines amounted to \$82,551, while the product for the past year amounts to \$343,359, showing an increase in one year of nearly 316%. It is now the second largest producer in Jasper county. When one considers the increased expense attending the sinking of a shaft on this property, as compared with other property, owing to the depth a shaft has to be sunk before the paying ore is reached, it is a little surprising to understand why 76 men should be prospecting, unless great promise of continued increase and prosperity possessed them. There are 18 mines producing ore with an average depth of shafts of 150 feet, and 206 men employed. The following are the principal sub-operators on this property:

Ayler Bros., Stewart & Son, Hayden & Rowe, Stevenson & Co., Stewart, Rule & Co., Harden, Smith & Co., and Shoenberger & Zogg. All of the above named have concentrating and cleaning works, nearly all of which have been erected during the past year. The equipment on this property is not excelled in the district.

Garrison Lead and Zinc company—O. F. Garrison, president. Mines located in Webb City. The company has eight producing mines with shafts averaging 160 feet, and employing 40 men. Twenty other men are prospecting on this property. The improvements during the year has been the addition of another engine, crusher and rolls. At date of our visit water was being pumped from the mines about the main plant, while the mines at Sucker Flat and other portions of the property were producing considerable ore.

Houghton & Son—This mine is located on a town lot in Sucker Flat, within the city limits of Webb City. They have one mine producing ore, with shaft 130 feet in depth, and employing 18 men.

Keller Mining company—The mines are located southwest of and near the city limits of Webb City. Three mines are producing, with shafts varying in depth from 155 to 180 feet, and employing 15 men. New shafts have been sunk and new pumps put in during the past year.

J. F. Lewis—This mine is located on a town lot in Sucker Flat in the city limits of Webb City. One mine, with a shaft 150 feet deep, is producing ore, and employs 15 men. It has a steam plant.

Minneapolis and Webb City Mining company—J. S. Thombs, manager. This is a new company. No report of ore for past year is made; prospecting was being carried on only. At the time of our visit, June 1892, two shafts were well down. Since that, and under date of July 23, 1892, we have report from the company, which states that a good body of zinc ore had been opened up.

Motley Mining company—George Warne, superintendent. Mines located within the city limits of Cartersville. Two mines are being operated, with shafts of an average depth of 150 feet. At the time of our visit 36 men were employed at the mines and 10 men prospecting. Both lead and zinc ores are mined, with the zinc ore largely in excess of the other ore. The plant of the company is very complete.

Mound City Mining company—Louis Helm, superintendent. Mines located near Cartersville. The company has a 40-acre lease of the Connor land. The pumping and hoisting plant is very good, and a new concentrating plant will be erected, we are informed, as soon as the ore body is sufficiently opened up. The ore is said to be of good quality, and the prospect encouraging. This property adjoins the Cherokee and but a short distance from the Victor mine. Good ore has been struck in shaft No. 1, and is now producing regularly.

Nevada Mining company—W. H. Keeler, superintendent. The mines are located at Webb City. When running, two mines are operated, employing 26 men. At the time of our visit but little work other than scrapping in the old and caved ground was engaged in, as the water was up and the company waiting for ground to be drained.

Noble Mining company—The mines of this company are located in Sucker Flat, within the city limits of Webb City. The property belongs to General Noble, of St. Louis. Three mines are producing, 25 men being employed, and both lead and zinc ores mined, the first of which

is found at a depth of 40 feet, while the zinc is mined at a depth of 180 feet. It has a very good plant, consisting of steam-jigs, pumps, etc.

W. B. Perry land—W. B. Perry, proprietor and superintendent. The mines of the above are located at Carterville, adjoining the Eleventh Hour Mining Co.'s lands. Operations were commenced this year, or about January, 1892. The plant and buildings are new. The North Star Mine on this land is operated by Kirk, Terry & Co. and is producing steadily.

Richland Mining company—J. M. Waugh, superintendent. This is a new company, with its mine located at Carterville. The plant was erected and operations commenced about August 1, 1891. It has a very good jig plant, and runs two shifts. The hoisting plant is one of the most complete to be found in the district, using single cages, similar to those used at coal mines, and operated by a good engine. One shaft of 145 feet in depth is being worked, with 50 men employed in and about the mines. There are 15 men prospecting upon the property.

Rising Sun Mining company—A. B. McKee, superintendent. Mine located near Carterville, on the Connor land. This is a new mine, and has been operated but a short time. It has a complete plant, and 21 men are employed. One shaft is operated, producing zinc ore only, which is said to be of good quality.

A. T. Steelman & Co.—Mine located on a town lot, in Sucker Flat, in the city limits of Webb City. One mine is being operated, producing both lead and zinc, with 12 men employed.

Tiffin Mining company—This company has a 10-acre lease of the Connor land near Carterville. The mine is a new one, no ore having been sold during the past year. The shaft is in a good body of mineral at a depth of 200 feet.

Tower, Davey & Co.—The mines are located at Carterville, and are what was formerly known as the North Carterville Mining Co. When running, seven mines with shafts of an average depth of 130 feet are operated, employing 50 men, and produce both lead and zinc ores. These mines have been good producers, although at the time of our visit but little work was being done, due principally to the water covering the lower ground and some cave-ins. The few men found at work were scrapping.

Troup Mining company—S. H. Cobb, general manager. Mines located at the town of Prosperity, in the Carterville district. Six mines, having shafts of an average depth of 186½ feet, are operated, employing 132 men. The plant is a very good one. The company has

made a large increase in its production over the preceding year, amounting to 57%, which likely would have shown very much greater had it not been for a serious accident occurring last spring, in which one of its mines was ruined by a cave-in, and the burning of its concentrating works at the same time. A further notice of this accident may be seen by referring to accidents in lead and zinc mines. After the necessary cleaning up and the rebuilding of its plant, still greater increase for the coming year is confidently expected.

Victor Mining company—Thomas R. Cobb, secretary. Mines are located on a 40-acre lease of what is known as the Connor land, situated near the two cities of Carterville and Webb City. Two mines, with shafts averaging 195 feet in depth, are operated, giving employment to 57 men, and producing zinc ore only. It has a complete steam-jig plant at each shaft. A new shaft is being sunk midway between the two now operated. Mining has been confined to but two lots, and considering the small number of shafts operated, it is one of the largest producers in the district. We understand that a three-fourths interest in the company was sold a short time since to some parties from Ohio for \$75,000. The increase of the production for the past year over the one preceding amounts to 75%.

J. N. Wilson & Bro.—Own a large tract of land adjoining Webb City on the northwest, upon which a deposit of bituminous coal occurs. It was opened during the past year, first by shaft, then by stripping the overlying clay and quarrying out the coal. The deposit is said to extend over about 4 acres and is reported to be 5½ feet in thickness.

During the past year 2123 tons of coal were produced, valued at \$4246.

The report from this mine was not received at the office until after our statistical tables on coal mines had been closed, and for that reason it was not included in the table.

SCOTLAND POSTOFFICE.

Burch Mining company—Mines located at Scotland, 6½ miles east of Joplin. Three mines, with shafts averaging 140 feet in depth, are operated, employing 19 men. The equipment is good, consisting of engines, boilers, pumps, crushers, rolls and steam-jigs. At date of our inspection very little was being done except pumping water preparatory to a fresh start. Speed Bros. are the principal operators on this property.

ZINCITE POSTOFFICE.

J. Copley Mines—Mines located at West Hollow, south of Zincite, and embraced in a 13-acre lease of the Lewellyn land. Two mines, with shafts averaging 95 feet in depth, are being operated.

The plant consists of engines, boilers, pumps, crushers, steam-jigs and hoisters. Twenty-one men are employed.

Gretchen Lead and Zinc company—Mines located at East Hollow, near Zincite. Two mines, with shafts having an average depths of 125 feet, are operated, employing 22 men, and equipped with a steam plant. At the time of our visit the mines were not running, and but little other than prospecting had been done during the spring.

Hoff Mining company—Mine located at Zincite. We found at the time of our visit to the mine that but little had been done since the spring rains. One mine with shaft 80 feet deep, when running gives employment to 14 men. The mine is equipped with a complete steam plant.

Knoble Mining company—Mines located at Zincite. Three mines, with shafts averaging 90 feet in depth, are operated, and employ 21 men, and equipped with a good steam plant. During the past year two new shafts have been put down and a new steam hoister put in. The company has not fully recovered from the effects of a fire, which caused considerable delay. In addition to the mines operated by the company, Messrs. DeGraff & Watkins are also operating a mine.

Mineral Creek Lead and Mining company—Mines located at Sherwood, near Zincite. One mine, having a shaft 150 feet deep, has been operated. During the year the shaft has been sunk deeper and new pumps put in. The mines are now under new management.

Pat Murphy Land—Mines are located at Zincite. Two mines having shafts averaging 75 feet in depth have been operated, and employed 18 men. Very little has been done of late except prospecting.

St. Charles Lead and Zinc company—N. G. Douglas, superintendent. This company owns 80 acres of land near Zincite. Quite a number of mines have been opened on this property, but for the past three years have been idle.

The company is now engaged remodeling and overhauling all machinery, etc., and intend putting in new tram-ways at once, as well as making other improvements.

Standard Lead and Zinc Mining company—Mr. Dangerfield, superintendent. Mines located near Bellville, in Zincite district, on a 67-acre

tract owned by the company. There are 5 mines, having shafts of an average depth of 150 feet, being operated, producing zinc ore, and employing 70 men. It has a steam plant, consisting of 2 engines, 2 boilers, 2 pumps and 2 sets steam-jigs. D. C. McConey is operating two lots on this property.

West Hollow Mining company—Mines located on the Brooks land near Zincite. The plant consists of 6 boilers, 4 pumps, 2 crushers and 2 steam-jig plants. Shafts average 100 feet in depth, and zinc ore only is produced. Forty-five men are employed. This company claims to be the original West Hollow Mining Co. At the time of our visit, but little work was being done on account of water.

West Hollow Lead and Zinc Mining company—Mines located near Zincite. There are 6 mines having shafts of an average depth of 105 feet, and when running employ 60 men, producing both lead and zinc ores. The plant consists of 4 boilers, 4 pumps, 2 crushers and 1 plant of steam-jigs. At the time of our visit, the mines were not being operated.

JEFFERSON COUNTY.

Production, 412 tons lead, 2075 tons zinc ores.

The output of both lead and zinc ores has shown a slight decrease in this county during the past year, as compared with the report of the preceding year. That report showed the output to have been 497 tons of lead ore and 2116 tons of silicate of zinc, while this report gives the product at 412 tons lead ore and 2075 tons of silicate of zinc.

VALLE MINES POSTOFFICE.

Valle Mining company—L. J. Rozier, manager, and J. M. Appleberry, mining superintendent.

This company owns a very large tract of mineral land lying in Jefferson and St. Francois counties, upon which a great many small mines have been or are being worked. Both lead ore and silicate of zinc are found. Two Scotch hearths and one calcine furnace are located upon the property near the mines, where the lead ore is smelted into pigs before shipping to market. The silicate is first roasted in the calcine furnace, then shipped to the Glendale zinc works at Carondelet to be smelted.

A rich deposit of galena was struck last fall, about one-fourth of a mile southwest of Valle mines station, and known as the "Cornstalk diggings." Indications of the ore were found in a railroad cut at the

time the road was being built, which led to the development of the deposit. The ore here is found from the surface to a depth of 50 feet, and the ore runs are sometimes found 15 to 18 inches in thickness although 6 or 8 inches is probably the average.

The "Garratee" diggings are located about three miles southwest of Valle Mine postoffice. They consist of eight shafts, five or six of which were in operation at date of inspection (May 25, '92). Shaft No. 6 is the principal producer; it is 135 feet deep and has penetrated three runs of mineral, the first at a depth of 60, the second at 95, and the third at 135 feet. The fissures or openings which contain the ore are found running in every direction, sometimes crossing each other, or one may branch off into two or three leads, and often it occurs that a round perpendicular opening is found which throws the run of ore up or down as the case may be. These round "chimneys," as they are called by the miners, often contain a large amount of galena.

About 2½ miles southeast of these mines, and probably 2 miles southwest of the lead furnace, are located the "zinc mines," as they are locally called, owing to the fact that they produce all the silicate of zinc mined upon the company's property.

These mines are situated in St. Francois county, but as the company's office and other mines are in Jefferson county they are reported under the latter. Several of these mines were in operation at the time of our visit, employing from 2 to 4 men in each shaft. The depth at which the ore is found below the surface depends largely upon the point of the hill at which the shaft is sunk. Some ore has been found near the surface, while further up the hill it was necessary to sink 180 and 190 feet to reach it.

The company does not employ miners, but it gives them permission to mine upon the property, purchasing their output and paying the market value of 400 pounds of lead at St. Louis for 1000 pounds of lead ore at mines, and \$6 per ton for silicate of zinc.

About 125 to 130 men and boys are employed in and about the 25 shafts which are in operation.

LAWRENCE COUNTY.

Production, 5720.93 tons lead ore; 13,861.28 in zinc ore.

Lawrence county is a very important mineral-producing county. It now ranks second in the production of zinc ore and third in lead. The output for the year just closed compares favorably with the report for the preceding year; while the output of zinc ore has shown a decrease, the production of lead ore has exceeded largely any previous

year in the history of the county, being 5720.90 tons against 4461.61 tons for the preceding year, showing an increase of 1259.29 tons, and for the same period in 1891, the zinc production was 15,352.62 tons, while this report shows the output to have been 13,861.28 tons, a decrease of 491.34 tons. The average value of zinc ore in the report of 1891 was given at \$15.28 per ton, while lead ore was reported at \$51.78. This report shows the average value of zinc ore to have been \$16.11, and \$46.17 for lead ore.

It will be observed that zinc ore is reported at a much less figure than in some other counties of the State. This is due to the large per cent of silicate of zinc produced, an ore worth only a little more than half that of zinc blende. We give below a partial description and location of each important company.

AUROBA POSTOFFICE.

Aurora Zinc company—The property of this company is located about 1 mile east of Aurora. The ore-producing mines located upon it are operated by the following named companies:

Big Bonanza—Shaft equipped with fair hoisting machinery, and a complete concentrating plant is in use. It furnishes employment to about 22 men.

The Little Bonanza—Is also equipped with a good concentrating plant and hoisting machinery. It gives employment to about 18 men.

The Independent Mining company and Hoffard & Peake—Each employ about 28 to 30 men. Both mines are equipped with steam hoisters. The ore is obtained at a depth of about 70 feet below the surface.

Frank Berry—Mines are located near Aurora. At date of our visit four mines were in operation, furnishing employment to about 20 men. Both silicate and lead ores are found at an average depth of 35 feet.

Black Land Mining company—Jacob Thielen, superintendent. This company's property adjoins the city of Aurora on the northeast. At date of inspection 12 ore-producing mines were in operation, the average depths of which are about 65 feet.

These 12 mines furnish employment to about 91 men and boys, and during the past year the property has produced \$75,474 worth of mineral, being the second largest ore-producing company in the county.

Both lead and zinc ores are produced, with lead ore largely predominating.

The principal ore-producing mines are operated by Plumb & Williams, A. D. Johnson, Hall & Fry, Baker & Co., App'le & Son.

Brinkerhoff Mining company—F. H. Brinkerhoff, president. Mines are located about 1 miles east of Aurora station, upon a 7-acre tract of land. At date of inspection 5 ore-producing shafts were being operated; the average depths of these shafts are about 90 feet. The Nickel Plate and the Summit City companies, which are located upon the land, each have a complete concentrating plant, consisting of crusher, rolls and steam-jigs; and the little Summit mine is equipped with a crusher, but employs hand-jigs to clean the ore. A large concentrating plant is being erected upon the land by Messrs. Merrill & Winslow.

There are about 75 men employed in and about the ore-producing mines and 10 employed prospecting.

Cleveland and Aurora Mineral Land company—Mining property is located near Aurora. It consists of the mines formerly operated by the Missouri Mining Co., Stewart Mining Co. and Vance Mining Co., and is by far the largest ore-producing property in the county. At date of inspection (August 1892), about 17 ore-producing shafts were in operation, furnishing employment to 99 men and boys. The principal ore-producing mines are operated by John Wilson, Irby & Buchanan, Valley Queen, Wilson & Paynor, Ruby & Co., Reynolds & Co., Johnson & Son, Johnson Bros. & Co., Wallace & Co., France & Seeborn and Stone & Ramsey.

We are informed by the officials of the company that from the present indications, the output for the coming year will exceed that of the one just past.

O. M. Dayton—Mines located about one-half mile west of Aurora. The principal ore produced upon this property is found near the surface—the average depth of the shafts not exceeding 35 feet. Silicate of zinc, dry bone and galena ores are found, but that of silicate in the largest quantities.

At the date our statistics were collected, 7 ore-producing shafts were in operation, furnishing employment to 31 men.

Decatur Lead and Zinc company—Geo. Van Riper, superintendent. The property of this company adjoins the city of Aurora on the north-east. Some of the most valuable shafts upon the land have been flooded with water a portion of the past year, which greatly retarded the workings. The five ore-producing mines which are in operation furnish employment to 23 men. These mines are operated by W. J. Singer, Equitable Mining Co., John Schnure, Welton & Co. and L. Monday.

S. G. Elliott—Property adjoins Aurora on the west. Ore was struck upon this land about one year ago, and at this date, August, 1892, 4 ore-producing shafts are in operation. The mineral is found from 20 to 60 feet below the surface.

Kentucky Mining company.—Geo. Van Riper, superintendent. The property of this company is located about 1 mile east of Aurora station, and is the third largest ore-producing property in the county. During the past year considerable prospecting was done and zinc ore found at a depth of 160 feet, while the shafts producing the bulk of the output do not exceed 90 to 105 feet in depth.

At date of inspection 9 shafts were in operation, furnishing employment to 73 men. The more important mines upon the land are operated by The Little Rustler Co., Line Shaft Co., Campbell & Co., Hoosier Mining Co., Oarlin & Co., Stratton & Co., Young & Co. and Wickwire & Co. The Little Rustler Co.'s plant is equipped with a good concentrating plant, consisting of crusher, rolls and steam-jigs.

T. J. Liles—Mining property is located at Aurora, and is the fourth in order of production in the county. But the output during the past few months has been comparatively small, owing to the heavy rains last spring flooding the mines. Only one mine, Williams & Co., was in operation at date of inspection. It furnishes employment to 10 men.

Louisville Zinc and Lead Mining and Smelting company—The property of the company adjoins the city of Aurora on the east. At date of inspection 7 shafts were in operation, furnishing employment to about 21 men. These mines, like many others in the vicinity, suffered greatly from the heavy rains during the spring, which retarded the work and from which cause the mine operators have not fully recovered. But we are informed that the company hopes to have the ground thoroughly drained in a short time and mining operations prosecuted as before.

Midland Mining company—Geo. Van Riper, superintendent. Mines located in the vicinity of Aurora. This company also report that the spring rains have greatly hindered the operations of their mines, but state that the present indications point to a more prosperous year for 1892 and 1893.

The principal ore-producing mines are operated by J. A. Byers and Ray & Co.

Both silicate of zinc and lead ores are found, but the silicate is in the largest quantity.

Nevada Gem Mining company—E. Emmons, superintendent. This property adjoins Aurora on the southeast.

Dry bone (lead ore) is the only ore thus far produced. It is found in the clay near the surface—none of the shafts exceeding 35 feet in depth. From 10 to 15 men are employed.

New York Land and Mining company—Geo. Van Riper, superintendent. Mines located at Aurora. At date of inspection no actual mining was being done, but there were 8 men prospecting, and we are informed by the superintendent that prospect shafts will be sunk to the depth of 200 feet during the coming year.

Ozark Range Mining company—C. F. Johnston, superintendent. The property is located about $\frac{3}{4}$ of a mile east of Aurora. At date of inspection two mines were in operation upon the land, one operated by the company and the other by Hays City Mining Co. These mines are equipped with a good concentrating plant, consisting of crushers, rolls and jigs. These two shafts, together with the concentrating plant, furnish employment to 18 men and boys.

Rinker Lead and Zinc company—J. L. Rinker superintendent. This company's property adjoins the city of Aurora on the east, and is classed as one of the county's large producers. At the time these statistics were collected, 15 shafts were reported as producing ore, the average depth of which is about 50 feet. Silicate of zinc, dry-bone and galena ores are found, but the silicate largely predominates. There are 75 men employed in and about the 15 shafts.

Schmook Mining company.—O. Schmook superintendent. These mines are located upon a 40-acre tract of land, lying one and one fourth mile northeast of Aurora.

Ore was first struck upon the land in January 1892, since which time \$20,779 worth of mineral has been produced. At date of our visit, 8 ore-producing shafts were in operation, furnishing employment to about 75 men.

Zinc blende, silicate of zinc, and galena ores are found.

The names of the parties operating the mines are as follows:

Costs & Co., Furby & Co., Apple and Tate, Cook and Nathan, Van Frank & Co., Span & Co., Spell & Scott, and Monogue & Co.

St Louis-Aurora Mining company—L. C. Hubbell superintendent. Property is located about $1\frac{1}{4}$ mile east of Aurora. Ore was struck upon the land about one year ago, since which time the mines have developed into and are classed as large ore-producers of the county. The product is hoisted from two shafts, each of which is equipped with good hoisting machinery. We made a careful examination of the inside workings and hoisting appliances October 18, 1892, and found

the mines well ventilated, and in reasonably good condition. Thirty men are employed.

Seamore Mining company—Chas. A. Reed, superintendent. Mines located about $1\frac{1}{4}$ mile north of the Aurora railway station. At date of inspection five shafts were producing ore, the depth of the shafts varying from 40 to 60 feet; both lead and zinc ores are found, and we are informed by the superintendent that a small coal pocket has also been encountered, at a depth of 80 feet.

Harry Wood Mining company—Mines are now idle and have been during the past year, but the company continues to operate its concentrating plant.

PEIRCE CITY.

Peirce Mining company—Mr. Mark Patton, manager. Mine located three-fourths of a mile northeast of Wentworth. Steam plant; shaft 110 feet deep. The mine is equipped with a good concentrating plant, consisting of crushers, rolls and steam-jigs. We made an examination of the machinery and inside workings October 14, 1892, and found the mine well drained and in good condition. Silicate of zinc and zinc blende are the only ores obtained. Seventeen men and boys are employed.

A number of other ore-producing mines have recently been opened in this vicinity, and from the present outlook Wentworth will become a very important ore-producing camp in a few years.

Mines have recently been opened about eight miles west of Mt. Vernon, on the Statts estate. The property is known as the Statts City Mines. One shaft is in operation; it is 115 feet deep, equipped with steam hoister, crushers, rolls and hand-jigs. Seventy tons of zinc ore have been produced during the past year, valued at \$22.50 per ton. Wm. Robinson is superintendent.

MADISON COUNTY.

Production, 4403 tons lead ore.

Rowland Hazard—J. D. Sanders, superintendent. Mine located at Mine LaMotte, about 4 miles northeast of Fredericktown. This gentleman owns a very large tract of mineral land in this vicinity, upon which this plant is located, and the mines are among the oldest, if not the oldest, in the State. Three mines are in operation, varying in depth from 100 to 150 feet. The ore now being worked is found disseminated in magnesian limestone, although, in former years, a great deal of very high-grade galena ore was obtained in the clay near the surface.

After the ore-bearing rock has been mined, it is hoisted and conveyed to the concentrating works and crushed, then passed through the rolls, thence to the jigs. Here the ore is separated from the waste rock by jigging in water, and the tailings or waste rock are hauled off and dumped, while the ore is taken to the calcining furnaces and roasted in order to drive off the sulphur and other impurities contained in it. From here it is conveyed to the smelting furnaces and smelted into pig lead, after which it is ready for market.

This plant, including dressing-works, machine-shop, furnaces and mines, furnishes employment to about 292 men and boys, 120 of whom are employed at the mines, and whose wages vary from \$1.15 to \$1.75 per day.

We made an inspection of these mines May 30, 1892, from which the following report is made:

Mine Nos. 1 and 2—Are both in operation, but all the ore is hoisted out of No. 1, which is equipped with fair machinery for hoisting the product.

A good ladder is erected in No. 2, which affords an escape for the workmen in case of an accident to the main shaft or machinery.

The ore is worked on two levels, one 45 and the other 100 feet below the surface.

The roof is of a hard limestone formation, which is supported by pillars, which are left for that purpose as the situation demands.

From 80 to 90 men and two mules are employed. The mines are well ventilated and in good condition.

Mine No. 4—Shaft is 137 feet deep and equipped with good machinery for hoisting the ore, and the cage is constructed with safety catches and cover over same as the law requires.

An escapement shaft has been sunk and equipped with a good ladder. The overlying roof, like that in Nos. 1 and 2, is good, and the mine is well ventilated and in good condition.

Mine No. 5—Is a steam plant also, and is the deepest shaft operated by the company, being 150 feet deep. All the work being done at date of inspection was confined to the drawing of pillars, and for that reason no inspection was made of the inside workings.

MILLER COUNTY.

Production, 25.10 tons lead ore.

Miller County Mining and Smelting company—P. F. Hauenstein, of Tuscumbia, secretary. This company owns a small lead furnace, located about 7 miles north of Tuscumbia, where all the ore produced in the county is smelted. The ore is mined by so many different parties, and in such small quantities, that we thought best to secure the output through the Smelting Company, the secretary of which has kindly furnished the information.

The ore is usually found in the clay, near the surface, or in shallow shafts, and is a high-grade galena, which we are told produces from 70 to 72% pig-lead, even in their crude furnace.

The principal ore-producers are: L. E. Milton, David Albertson, John Shackles, Jas. Melton, A. M. Buster and Bennett Roberts, all of Tuscumbia; Ed. Spalding, Spring Garden, and Robert Pinkston, Pleasant Mount.

MORGAN COUNTY.

Two or three years ago, considerable prospecting for lead and zinc ore was being done 6 or 7 miles southwest of Versailles, but the enterprise seems to have been abandoned, as no ores have been reported from the county during the past year, and we understand that no mining is now being prosecuted in that vicinity. We are informed that the old Bluff Springs mines, located near Akinsville, have been sold to Thos. A. Russell and others, of St. Louis, who have erected a 65-horse-power boiler, Cook pump, new hoister, and are now sinking a shaft which is down 130 feet, passing through paying ore. The zinc blende which is found at these mines is rich, therefore commands a good price in market. It is said that about \$15,000 worth of zinc ore has been produced at these mines, but none during the past year.

NEWTON COUNTY.

Production, 1249.63 tons lead ore, 8342.75 tons zinc ore.

This county stands fourth in the order of ore-production. Her principal mines are located near Joplin, along the northern border of the county; Seneca and Racine, in the western part of the county, and at

Granby. More than one-half of its entire mineral output was produced at the latter place by the Granby Mining and Smelting Co.

Prospecting is continually going on at different places throughout the county. At Wentworth, several paying shafts have recently been sunk and are now being opened up, and we are informed that considerable prospecting and some fair developments have been made in the vicinity of Newtonia.

During the past year 1249.63 tons of lead ore and 8342.75 tons of zinc ore were produced, aggregating a valuation of \$227,587.96.

The average price per ton received for the lead ore was \$44.06, while the zinc ore was sold at an average of \$20.68 per ton.

The report for the preceding year shows the output to have been 1504.60 tons lead ore and 7900.70 tons zinc ore, the aggregate value of which was \$210,723.70—thus showing an increase of 442.05 tons of zinc ore, while the lead ore has shown a decrease of 254.97 tons.

GRANBY POSTOFFICE.

Granby Mining and Smelting company—Mr. John Kingston, superintendent. This company owns large tracts of mineral lands lying in Newton and Jasper counties, the product from which adds largely to the output of lead and zinc ores, each year, from Southwest Missouri.

The tract upon which the mines of this company are located is situated at Granby.

This property has been producing large quantities of ore for many years, and from the present outlook will continue to do so for some time to come. Mining is conducted on the same general principle here as at Joplin and other places throughout the southwestern part of the State, in this, that the land-owner gives mining privileges or a lease to those desiring to mine upon the property, and charges a certain fixed per cent as royalty on all ores produced. Mr. Kingston, the superintendent, often takes an interest in mining lots with the miners in order to encourage them and to develop the property. At date of inspection about 40 shafts were being operated, varying from 50 to 100 feet in depth.

These shafts furnish employment to about 164 men and boys; besides, there are probably that many more prospecting upon the land.

Both lead and zinc ores are found, with the zinc ore predominating. All ores are cleaned at the company's concentrating plant, and the lead ore reduced at the mines by two Scotch hearth furnaces, but the zinc ore is shipped to Pittsburg, Kansas, to be smelted.

The principal mines which were in actual operation at date of inspection (September 1892) are as follows:

Name of operator or company.	Men employed	Mach'ry in use	
		Boilers.	Pumps
Adkins & Co.....	4	1	1
Adkins & Brewer	4	1	1
Arnott & Chester.....	4	1	1
Bailey & Co.....	5	1	1
Burney & Co.....	4	1	1
Carlyon & Co.....	4	1	1
Enery & Co.....	4	1	1
Green & Brewer.....	5	1	2
Hyde & Co.....	4	1	1
Johnson & Mesplay.....	4	1	1
Kincannon & Bell.....	5	2	2
Litten & Co.....	5	1	1
Meddows & Co.....	3	1	1
Parker & Co.....	4	1	1
Rambeau & Co.....	4	1	1
Richardson & Co.....	4	1	1
Seathers & Co.....	4	1	1
Spangle & Skaggs.....	4	0	0
Thomas & Wood.....	4	1	1
Trent & Hood.....	4	1	1
Trout & Co.....	4	1	1
Woodcock & Turner.....	5	2	1
Walker & Co.....	4	1	1
Winchester & Johnson.....	4	1	1
Woodcock & Patterson.....	3	1	1

JOPLIN POSTOFFICE (JASPER COUNTY).

Emilie Zinc company—A. A. Sewall general manager. This property adjoins the Empire zinc company's land on the south. At date of inspection, two shafts were producing ore, both of which are equipped with steam hoisters. The two mines furnish employment to about 17 men.

Fairbank's Mine—Located about 3 miles southwest of Joplin, and just south of the Jasper county line.

Two shafts were producing ore at the time our information was collected, furnishing employment to 14 men. We are informed that the company is now putting in a new steam pump, and preparing to sink deeper. The ore now being worked is found at a depth of 60 feet.

McClelland and Maupin—Prospecting about 3 miles southwest of Joplin. They have mined some lead ore, which was found at a depth of about 60 feet.

Norton Land & Mining company—Mines located in Newton county, just south of the Jasper county line.

The mines were closed down last spring, and have been idle ever since. Zinc is the only ore reported as having been produced; it was found at a depth of about 110 feet.

Roaring Springs Land and Mining company—E. Hedburg, superintendent. Mines located about 4 miles southwest of Joplin, in what is known as Gordon hollow. The report of these mines shows a large increase in the production over the preceding year, and more activity has been manifested in the development of new mines than heretofore, and we are advised that the prospects are good for the coming year.

Two concentrating plants are in operation upon the land, consisting of crushers, rolls and jigs.

The principal lease-holders who were operating mines upon the land at date of inspection (August 1892) are as follows:

	Shaft.....	Employees..	Machinery.	
			Bollers.	Pumps.
Davison & Brown.....	60	8	1	1
Crane & Co.....	35	10	.....	.....
Graham & Malony.....	75	6	.....	.....
E. Hedburg & Co.....	70	10	1	1
Joplin Herald Co..	30	8	.....	.....
Lackey & Sons.....	60	15	1	1
Lee & Alegar.....	75	10	1	1
Maxfield & Miller.....	70	8	1	1
Stewart & Murphy.....	60	9	1	1
Wheeler & Co.....	75	12	1	1

From the foregoing table, it will be seen that the ore is obtained in shafts varying from 30 to 75 feet in depth; from which we infer that a comparatively small amount of capital is necessary to sink and equip a shaft for operation upon this property.

Both lead and zinc ores are found, but the zinc is found in the greatest quantities.

Scotia Mining company—Col. H. H. Gregg manager. This property is located about 4 miles southwest of Joplin. Mines were opened upon this land last November, and at date of inspection (August 1892) five shafts were producing ore, and furnishing employment to about 37 men. The ores are found at a depth of about 50 feet below the surface.

The names of the parties operating these mines are as follows:

Caney & Co., Cowan & Stewart, C. C. Kidder and Frye & Jaccard. All these companies use horse hoisters, except C. C. Kidder, who uses a windlass, and Frye and Jaccard who employ steam power. The mines produce both lead and zinc ores, but the zinc largely predominates.

Tan-yard Hollow—Murphy & McCracken, proprietors and managers. Mines located a few miles southwest of Joplin. At date of inspection, three shafts were in operation, furnishing employment to about 19 men. Ore is found at a depth of about 60 feet.

This report has been erroneously tabulated in the statistical table under Jasper county, in place of Newton county, and the mistake was not observed until it was too late to make the correction.

NEWTONIA POSTOFFICE.

K. D. F. Mining company—We are in receipt of a letter from Mr. David Kilgore, manager of the above named company, stating that their company has one shaft, which is producing considerable silicate of zinc and lead ore; he also reports other ore-producing mines upon the land which are now idle.

Considerable prospecting is being carried on in section 1, township 25, range 30, by The Ritchey Ranch Mining Company, and several prospect shafts have been sunk in section 15, by the Newtonia Valley Mining Company.

RACINE POSTOFFICE.

Henderson Mining company—R. I. Henderson, superintendent. Mine located in section 1, township 25, and range 33. Only one mine is reported as being in operation. It is 50 feet deep, and furnishes

employment to 6 or 8 men. Mr. Henderson writes us that they have sunk a shaft to a depth of 90 feet, and encountered good ore at that depth, but states that before extensive mining can be carried on, heavy pumping machinery will have to be employed to drain the ground. Both lead and zinc ores are found.

SAGINAW POSTOFFICE.

Saginaw Lead and Zinc company—John Reinmiller, manager. This property is located at Saginaw postoffice.

The output has been small during the past year, owing to the heavy rains during the spring flooding the mines; but we are informed that the company will soon erect more pumping machinery, after which, it is thought, mining will progress more satisfactorily. Two shafts are now in operation, each of which is about 30 feet in depth.

SENECA POSTOFFICE.

Seneca Lead and Zinc company—Charles Huber, manager. Mines located about $1\frac{1}{2}$ mile east of Seneca.

Two shafts are in operation, each of which is 120 feet in depth. Both lead ore and silicate of zinc are being mined, but the silicate is found in the greatest quantities. The plant is equipped with a complete concentrating plant, hoisting engine, steam pumps etc. It furnishes employment to about 10 men.

C A Potwin—Mine is still idle, owing to the land being in litigation.

WENTWORTH POSTOFFICE.

Considerable prospecting is being done in the vicinity of Wentworth, by Purdy and Jones, Mollie Gibson Mining Co., Pittsburg mining Co. Smith & Gilbert and Gobbler mining Co. Good paying mines are reported as having been opened by each of these companies, but none of them had produced any ore prior to the 30th of June, 1892, at which date our fiscal year ends, hence they are not reported upon in this report.

From the present outlook, this will be an important mining camp in the near future. The ore is struck at a depth of from 60 to 115 feet below the surface. Both lead and zinc ores are found in this vicinity.

ST. FRANCOIS COUNTY.

Production, 23,740 tons lead ore.

It is not generally known that St. Francois county mines nearly one-half of all the lead produced in the State. So far, but little has been said of her mineral resources, although these rich deposits of ore lie within a few hours' ride of the city of St. Louis

The ore developements which have recently been made on Flat river promise to contribute still further to the magnificent output which is reported each year from this county, and from the present outlook we are of the opinion that, unless depression in prices occurs in the lead market, the production will be doubled in a few years.

By an examination of the statistial table of this county it will be seen that in this report the output is given in tons of lead ore in place of pig-lead, as in former reports. This was done in order to enable us to make a more complete showing of the actual operations of our mines each year. Pig-lead may accumulate at a furnace for months at a time before a sale and shipment is made, and in this way we may get a report one year showing large sales, or in other words more than a year's business, while the report for the following year's operation may be small; which would be misleading to the public, and do the company and county in which the mine may be located an injustice.

It was for the above reason, and to enable us to make comparisons with other states, that the change was made.

This report, for the year ending June 30, 1892, shows an output of 23,740 tons of lead ore, valued at \$43 per ton, or a total value of \$1,020,798, while the report for 1891 shows the product to have been 16,537.5 tons of pig-lead, valued at \$79.33 per ton, or a total of \$1,311,961. If the lead ore produced during the past year was reduced to pig-lead and the value changed from \$43 to \$79.33 per ton, doubtless the value of the output would be as great, if not greater, than that shown in our last report.

Doe Run Lead company—J. Wyman Jones, president, and F. P. Graves, assistant superintendent.

This plant is located at Doe Run, but a large percent of the ore is now being produced at the company's mines, at Flat river, which have been opened up and put into operation during the past year.

The concentrating plant is the second largest in the State, being excelled only by the St. Joe Lead Company, of Bonne Terre.

The main building is 196 feet long and 72 feet wide, well constructed for economy and convenience. Machinery for treating the ore is

driven by a 300-horse-power engine. It consists of 4 Blake crushers, each of which is 9×15 inches, 4 sets of 14×30-inch cornish rolls, 4 revolving screens, 20 sets rougher jigs, 6 sets plunger jigs for treating fine ores, and 12 percussion tables for treating slime. We are told that the mill has a capacity of about 300 tons of ore per day of 24 hours.

Five calcining furnaces, 1 slag and 1 refining furnace are run in connection with the mill. The furnaces are not in operation at all times, however, but are run at intervals, as the business demands.

The Mississippi River & Bonne Terre railway, which was extended from Bonne Terre to Doe Run during the past year, furnishes good shipping facilities for the product.

There are about 270 men and boys employed in and about the mines, dressing-works and at furnaces, whose wages vary from \$1.20 to \$2.25 per shift of 8 hours—miners receiving from \$1.20 to \$1.50 per shift.

The Doe Run shaft has been in operation about five years. It is equipped with good hoisting machinery. The ore is worked at two levels, the first 63, and the second 108 feet below the surface. It is found disseminated in magnesian limestone, which is said to carry from 4 to 7% of lead. Great pillars are left at intervals of from 30 to 50 feet to support the overlying roof. In mining out the ore the operator drives a header in the top of the ore-bearing stratum, taking down all loose rocks, etc., after which the underlying ore is stopped out.

All drills and pumps are run by compressed air, which adds much to ventilation, and keeps the underground workings in a healthy condition. Ladders are located in both hoisting shaft and escapement shaft, thus affording good means of egress and ingress to all employes in the mine. No one is permitted to go up or down on the cage. J. H. Dace is mining superintendent.

Flat River mine shaft was sunk during the past year. It is 380 feet deep, being the deepest lead or zinc mine in the State.

A good steam-hoisting plant has been erected, and two Rand air-compressors put in to supply air with which to run the drilling machines. The shaft is well timbered and cages and safety catches in good condition.

At date of inspection (May 26, 1892) they were just getting the headings started off from the bottom. The ore, like that found at Bonne Terre and Doe Run, is disseminated in magnesian limestone.

An attempt was made to sink a shaft about 200 yards south of this mine last year, but a body of water was encountered at a depth of

96 feet, which proved too much for their pumps and of course stopped operations.

All the ore produced is shipped to Doe Run to be treated. John F. Flowers is mining superintendent.

BONNE TERRE POSTOFFICE.

St. Joe Lead company—J. Wyman Jones, president, C. B. Parsons, superintendent, and Gust. Setz, assistant superintendent. This plant is located at Bonne Terre, but general office of company is in New York.

The work in and about the mines, concentrating plant and furnaces is carried on in a systematic manner, each department being under the control of an assistant superintendent. Captain Thos. Porter has charge of all underground work, L. A. Thomner looks after the dressing works and machinery, while Mr. Glockner and Mr. Kobele have control of the calcining and smelting furnaces.

The concentrating plant is well arranged and equipped for convenience and economy. The machinery consists in part of 3 large Corliss engines, although only 2 of these are in use at any one time, the other being held in reserve in case of an accident to one of the other engines. Machinery for cleaning the ore consists of 10 large crushers, 10 sets of rolls, 64 sets double jigs and a great number of percussion tables for cleaning slime.

The plant actually handles about 800 tons of ore-bearing rock every 24 hours. In handling this enormous amount of ore, about 400 gallons of water per minute are used in separating the mineral from the waste rock. Improvements are continually being made at this plant. At date of inspection 3 Heine safety-boilers were being put in, aggregating a capacity of about 1125 horse-power, and the smelting furnaces removed and located at Herculaneum, about 30 miles north of Bonne Terre.

About 600 men are employed in and about the mines, dressing-works and at furnaces, whose wages vary from \$1.25 to \$2.25 per shift of 8 hours. Miners are paid from \$1.25 to \$1.60 for 8 hours' work, and all employes are paid in full every two weeks.

Mine No. 1—Steam plant; shaft 206 feet deep. This mine has been in operation for several years, and is the main producer. The underground workings have been driven nearly a mile in a northeastern direction, connecting with the old "Pen diggings." Near these diggings their richest ore is now being found. At this place an excavation has been made which is no less than 80 feet in height, and prob-

ably 150 or 200 feet wide and nearly as long—the roof being supported by large columns or pillars left at intervals as the situation demands.

The work is divided into three 8-hour shifts, each shift, or crew of men, being under a careful foreman.

All drilling is done by compressed air, 10 drills being in use at date of our inspection; mine is well drained and fairly well ventilated.

There are about 180 men and 24 mules employed in each 24 hours.

Mine No. 4—Is a new opening, having only been in operation about one year. It is about 140 feet deep; equipped with good machinery for hoisting the product and draining the mine. A part of the hoisting-shaft is bratticed off by wooden brattice work, in which a good ladder is erected, thus affording an ingress and egress for the employes without their being obliged to go up or down on the cage. Ventilation produced by the exhaust from the pump and drilling machines.

Mine No. 5—Is also practically a new shaft, having been put in operation about 2 years ago. It is 250 feet deep; divided into two compartments, one being used as a cage-way, and the other equipped with ladders, and used as a place of ingress and egress for the workmen.

Ventilation is produced by the exhaust from the pump and air-drills, but as the main gangway has been advanced quite a distance from the bottom, the pump seems to be doing but little good as a ventilator, and in our opinion the air from the drills is inadequate to furnish the amount of ventilation necessary to keep the mine in a healthy condition. Miners claim, however, that the inadequate ventilation does not affect them unless they return to work immediately after firing a round of shots, not waiting for the smoke to clear away. In this case they state that the smoke gives them the headache. In order to clear the smoke out, a hose is detached from a drill and the air turned on.

With the above exception, we found the mine well drained and in fair condition.

FLAT RIVER POSTOFFICE.

Central Mining company—Capt. Rodgers president, and H. S. Shaw superintendent. Mine located about 1 mile south of Flat river station.

The property is now in process of development, no ore as yet having been shipped. One shaft has been sunk to a depth of 242 feet, and a body of disseminated ore encountered upon which they were drifting at date of inspection (May 26 1892). We are informed that considerable surface mineral has been mined upon the property in former years. The company is now building a number of dwelling

houses, and making other improvement. From 18 to 20 men are employed.

Desloge Consolidated Lead company—John Desloge superintendent. Property located in township 36 & 37 N. R. 4 east, and consists of about 2100 acres of mineral land. Prospecting has been going on upon the tract, for the past two or three years, and several deposits of ore encountered. A shaft has been sunk to a depth of 220 feet, and several drifts or headings driven, out of which a large quantity of disseminated ore has been taken, and is now lying in stock at the mine. At date of inspection (May 26, 1892), an other shaft was being sunk, located about 800 feet southeast of the old one; It will be sunk to a depth of about 300 feet, where it will intersect with a drift from the old shaft.

About 50 men are employed upon the property.

Farmington Mining and Prospecting company—Robert Tutley, president, and Albert Woolem, superintendent. This property is located about 5 miles northwest of Farmington and 2 miles southeast of Flat River station. The mine, like others in the vicinity of Flat river, is just being developed. A rich body of disseminated ore was encountered in shaft at a depth of 175 feet, upon which they were drifting at date of inspection (May 26, 1892), and stocking the ore at the mine.

We were informed that the company contemplates getting a branch road connecting the mines with the M. R. & B. T. railroad in the near future.

Judge W. R. Taylor's property lies about three-fourths of a mile north of Flat River station, in townships 36 and 37 north, range 5 east, and consists of 1135.15 acres of land. A shaft has been sunk to a depth of 221 feet, and we were informed by the superintendent, John Dryden, that they would continue sinking until a depth of 370 feet is reached, where a second ore body is reported to occur. A stratum of ore was penetrated in the shaft at a depth of 207 feet, and some drifting done.

A number of prospect, diamond-drill holes have been put down upon the property, which we are informed show flattering results. The M. R. & B. T. railroad passes through the tract of land, thus furnishing good shipping facilities.

WASHINGTON COUNTY.

Production, 1793.63 tons lead ore.

The lead industry of Washington county has long been a source of revenue to its people. Its history dates back prior to the introduction of the State into the Union. The output during the past decade has not been as large as in former years, due probably to the depression in prices of pig-lead a few years ago, since which time it has not fully revived.

A large per cent of the galena is found in the clay near the surface, although some shafts at Palmer are being operated at a depth of 125 to 130 feet, and a few shafts have been sunk and ore worked at a depth of 80 to 100 feet in the vicinity of Potosi, Richwood, Cadet and other places throughout the county, but the average depth of the mines will probably not exceed 20 or 30 feet. The galena is found in cubes, and is very rich—the actual yield in pig-lead, we are informed, being from 65 to 72 per cent.

Eleven small furnaces are located at different places throughout the county, at which points the entire output is smelted, and it was through the kindness of the parties operating them that we obtained the mineral production. It would have been a matter of almost an impossibility to have secured the information otherwise, as the ore is mined in such small quantities and by so many individual operators and farmers, who keep no record of the amount produced.

Considerable zinc ore has been mined in the county during past years, but none recently. Barytes, however, is being mined very extensively, and is of nearly as much importance as the lead industry. Mr. James Long, of Potosi, a gentleman who is well versed upon the subject, informs us that no less than 10,000 or 12,000 tons of barytes are produced annually.

During the year ending June 30, 1892, 1793.63 tons of lead ore were produced, against 1850.25 tons for the same period last year, thus showing a slight decrease in the product during the past year.

The amount of ore reported by each of the smelters will be found by an examination of the statistical table of this county elsewhere in this report.

CADET POSTOFFICE.

Shibboleth Lead Mining company—J. B. Lathy, secretary and manager. This company owns a small lead furnace, located about 1½ mile west of Cadet. No ore is mined by the company, but they purchase

that which is produced in the vicinity of the smelter, paying the market price for the same. The output shows a decrease as compared with our last report.

FERTILE POSTOFFICE.

Z. F. Higginbotham—Mines and smelting furnace located near Fertile. The property has been producing ore for a number of years, during which time a large amount of mineral has been produced. The land-owner does no mining himself, but gives those who do permission to mine, and he purchases their product, paying the market value for the ore, deducting a certain per cent as royalty. The ore is found from a few feet to 80 feet below the surface, but we are informed that the average depth of the shafts is about 30 feet.

During the past year the output has been nearly double that of the preceding year.

OLD MINE POSTOFFICE.

Union Mining and Smelting company—O. B. Burnham, president, and Alex. Harrison, superintendent. This company owns a large tract of land in this county, upon which a number of mines are located. They also operate a lead furnace at Old Mine, where all their ore is smelted.

The company employs no men, but gives them permission to mine upon the land, paying them for the ore produced, deducting, of course, a certain per cent as royalty.

During the past year 295.8 tons of lead ore were smelted by the company, 155.9 tons of which were produced on their land, the other from adjoining properties. A great deal of barytes is also produced by this company each year.

Mrs. L. J. White—Owns a small lead furnace at Old Mine, which is leased to Thos. S. White & Co., who are operating it. During the past year 115 tons of lead ore, produced upon the property and adjoining lands, have been smelted at this furnace. This shows a slight increase over the preceding year's business.

PALMER POSTOFFICE.

Palmer Lead company—This company owns a large tract of mineral land in the vicinity of Palmer upon which these mines are located. The ore is found from near the surface to a depth of 130 feet. The depth at which the minerals are found depends largely upon the point at which the shaft was sunk: for instance, a shaft located low down on the hill would strike the ore much sooner than it would if located near the top of the hill. The openings, or fissures carrying the ore, usually

run about level, but in all directions forming in places a perfect network.

The company also run smelting works in connection with their mines, where all the product is smelted before shipping to market. The output during the past year was 600 tons, and for the preceding year 517 tons, showing an increase of 83 tons.

From 65 to 70 men are employed in and about the mines and at the furnaces.

POTOSI POSTOFFICE.

J. P. & R. M. Bugg—Operating a lead furnace, situated about 1½ mile west of Potosi. The mineral was mined on the McArthur Bros.' land by farmers and farm laborers at odd times, when not employed upon the farm. The galena is generally found near the surface, and is very rich. Even with the old-fashioned furnace which is in use, over 70% of pig lead was realized out of the ore last year.

James Long—Owns and is operating a small lead furnace near Potosi, where a large portion of the mineral produced in that vicinity is smelted. We are informed that most of the product is mined on the McArthur Bros.' land. Mr. Long also owns about 960 acres of land in the vicinity of Potosi, but it has produced only a few thousand pounds of ore during the past year.

Wm. Long—Is operating a small smelter about 7 miles northwest of Potosi. It has done but very little during the past year on account of the small production of mineral, which is mined by the farmers in the neighborhood. The ore is generally found in the clay near the surface and is very rich.

RICHWOOD POSTOFFICE.

Moran, Charles—This property is located about 3 miles east of Richwood, and is operated by Charles A. Stocking, agent. A small furnace is located upon the land, where all the ore produced in the vicinity is smelted, and as the mineral is found near the surface but little capital is necessary to obtain it; hence it is worked by a great many different parties when not employed at other vocations.

Flynn, John—This gentleman is operating a small lead furnace near Richwood, at which all the mineral produced in the neighborhood is smelted. No miners are employed by him, but he purchases the ore produced by them, and if the mineral is obtained on his land, 10% is deducted from the value as royalty. The galena is found from the surface to a depth of 100 feet and is very rich, about 67% of pig-lead being the average yield for the past year.

SULLIVAN POSTOFFICE (FRANKLIN COUNTY).

Abbyville Mining and Smelting company—John S. Carter, manager. This company owns a small lead furnace located in the northwestern part of Washington county, and about 7 miles southeast of Sullivan, Franklin county. The smelter was only erected a little more than one year ago, and we are informed that but little ore has been smelted by it since its erection.

At date of inspection (June 22, 1892) it, as well as the mines, was idle and had been since the 1st of January. The ore obtained is found in cubes, and is very rich in lead.

TABLE XIII—SHOWING THE PLANT, EMPLOYES, TONNAGE AND VALUE OF PRODUCT OF LEAD AND ZINC MINES IN MISSOURI FOR YEAR ENDING JUNE 30, 1892.

County.	No. of mines	Machinery in use.				Employees.			No. of men prospecting ..	Total tons of lead.	Total tons of zinc.	Av. price received per ton at mines.		Amount received for		Total amount received for year's output of lead and zinc.....
		Boilers...	Pumps...	Crushers..	Steam-jigs	Miners....	Others ...	Total ".....				Lead	Zinc	Lead.....	Zinc	
Barry	4	2	2	3	1	20	10	30	.....	84	192.50	\$48 00	\$16 04	\$3,864 00	\$3,088 62	\$6,952 62
Cole .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	.....	46 00	.....	1,610 00	.....	1,610 00
Dade .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98 75	103.50	30 00	10 30	2,962 50	1,066 75	4,029 25
Franklin .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	150	.....	42 00	.....	6,300 00	.....	6,300 00
Greene .....	.....	.....	.....	.....	.....	87	6	43	11	406 11	898.60	45 72	22 32	18,479 45	18,964 60	37,444 05
Jaeger	437	801	228	129	153	1949	1675	3624	753	11 500 95	108,606.01	46 09	23 79	530,004 31	2,416,333 00	2,946,477 31
Jefferson	25	.....	.....	.....	.....	100	20	120	6	412 60	2,075	46 00	12 55	18,979 60	25,041 25	45,020 85
Lawrence	116	42	30	17	12	861	438	819	118	5,730 90	13,981.28	46 17	16 11	264,136 10	224,401 44	488,537 54
Madison	8	5	4	1	12	120	172	292	6	4,403 25	.....	43 00	.....	189,339 75	.....	189,339 75
Miller .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25 10	.....	46 00	.....	1,155 53	.....	1,155 53
Newton	77	54	49	7	12	288	144	432	235	1,249 63	8,342.75	43 02	20 68	55,063 54	172,529 42	227,592 96
Perry	2	.....	.....	.....	.....	4	.....	.....	8	6 50	.....	25 00	.....	162 88	.....	162 88
St. Francis	6	20	13	14	130	397	154	551	29	23,740	.....	43 00	.....	1,020,798 50	.....	1,020,798 50
Washington .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,738 63	.....	45 35	.....	81,088 33	.....	81,088 33
Totals	677	424	326	172	320	3936	2619	5915	1161	49,626 42	131,457 64	44 21	21 76	2,194,029 54	2,892,475 08	5,086,504 62

In instances where operators smelt the ore product before shipping it to market, and did not furnish price for which the lead ore would sell at the mines, we have fixed the price, based upon prices received by other operators for lead ore of like character.

TABLE XIV—COUNTY EXHIBITS.

BARREY COUNTY.

Name of person or company operating mine.	Shafts.		Machinery in use.				Employees.			No. of men prospecting	Total No. of tons mined.		Av. value per ton at mine.		Total amount received.		Total amt't received for the year's output of lead and zinc
	Number	Av. depth in feet.	Boilers	Pumps	Crushers	Steam jigs	Miners	Others	Total		Lead	Zinc	Lead	Zinc	Lead	Zinc	
Allen Stark & Co.	2	35	1	1	1	1	4	6	10	.....	.....	40	.....	\$22 50	.....	\$1000 00	\$1000 00
Ft. Smith Mining and Smelting Co.	1	30	1	1	1	1	6	8	9	.....	.....	102 50	.....	9 85	.....	988 62	4823 62
Drake Mining Co.	1	20	1	1	1	1	10	1	11	.....	84	50	.....	22 00	.....	1160 00	1100 00
Totals	4		2	2	3	1	20	10	30	84	192 50	16 04	46 00	16 04	3864 00	3068 62	6653 62

COLE COUNTY.

Woodworth, J. D.	35	\$46 00	\$16 10	16 10
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DADE COUNTY.

Cory Mining Co.	98 75	\$30 00	\$2962 50	\$2962 50
Pemberton Mines.	63 50	\$10 50	866 75	866 75
Southwestern Mining Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	.....	.....	10 00	.....	400 00	400 00
Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	98 75	103 50	10 30	80 00	10 30	3962 50	1066 75	4029 25

FRANKLIN COUNTY.

Name of person or company operating mine.	Shafts.	Machinery in use.				Employees.			No. of men prospecting.	Total No. of tons mined.		Av. value per ton at mine.		Total amount received.		Total amt't received for the year's output of lead and zinc
		Boilers...	Pumps...	Crushers..	Steam-jigs	Miners...	Others...	Total		Lead	Zinc	Lead	Zinc	Lead	Zinc	
Bartle, J. H. (furnace.)	1	50	1	1	1	13	2	14	2	40	200	\$42 00	\$24 00	\$1920 00	\$2,800 00	\$6300 00
										150						\$6300 00
																\$6300 00

GREENE COUNTY.

Ananias Mining Co.	1	50	1	1	1	13	2	14	2	40	200	\$48 00	\$24 00	\$1920 00	\$2,800 00	\$4,720 00
Bay State Mining Co.	2	100	2	2	2	4	2	6	3	2 80		46 00	46 00	138 80	138 80	1,128 80
Gostz Mining Co.	1	34	1	1	1	15	15	15	3	36 31	600	47 00	25 00	1670 32	15,000 00	1,670 32
Gumbo Mining Co.	1	80	1	1	1	2	2	4	3	145	40	30 00	13 00	8815 00	520 00	21,815 00
Hunt, J. A. (ore buyer.) ..	1	80	1	1	1	4	4	4	3	26 50	58 60	46 00	11 00	792 78	644 60	7,792 78
Murray & North.	2	15	2	2	2	4	4	4	3	154 75		44 00	22 32	7119 55	18,364 60	7,639 55
Nixon & Holmes.	1	15	1	1	1	4	4	4	3	154 75		44 00	22 32	7119 55	18,364 60	7,639 55
Totals.	7	359	7	7	7	37	6	43	11	406.11	888.60	45 72	22 32	18,479 45	18,364 60	37,444 05

JASPER COUNTY.

All Gall Mining Co.	1	100	2	2	1	7	7	25	30	\$43 00	\$22 00	\$1,050 00	\$960 00	\$1,740 00
American Bull Pup Mining Co.	2	112	2	2	1	11	10	6	171	47 00	23 00	188 00	3,939 47	4,127 47
Ashcroft, Reynolds & Co.	4	150	2	3	1	10	6	32.5	15.8	45 00	24 00	1,495 00	370 20	1,865 20
Alba Co.	1	150	5	3	1	13	8	21	10	...	25 00	...	250 00	250 00
Alba Mining Co.	2	180	8	3	2	6	6	12	68.91	...	21 00	287 50	1,502 11	1,502 11
Bradley, E. E.	3	100	1	3	3	3	3	6	68.50	46 00	21 00	...	1,789 62	1,789 62
Burch Mining Co.	3	140	4	4	2	9	10	19	103.30	...	22 00	...	2,337 72	2,337 72
Burch, Murphy & Connor.	3	100	2	4	3	8	10	18	84.25	...	23 00	...	822 00	822 00
Carthage Mining Co.	23	110	1	3	1	14	16	30	674	...	23 00	...	15,500 00	15,500 00
Cave Springs Mining Co.	27	150	16	11	7	100	120	220	435	43 90	23 00	41,889 60	10,005 00	10,005 00
Center Creek Mining Co.	2	150	22	4	12	12	163	151	12,757.8	46 00	22 00	27,852 31	306,157 20	348,573 80
Chatham Mining Co.	2	85	3	2	9	12	21	5	13,537.4	48 00	23 15	24 96	301,469 91	329,322 22
Copley, J.	3	93	2	2	4	6	10	2	301.5	...	22 00	...	6,980 40	7,005 40
Cora Latta Lead & Mining Co.	11	140	6	1	5	17	32	6	175	46 00	23 00	6,689 69	3,920 00	3,920 00
Dougherty & Davey	7	150	6	1	4	35	40	75	1,016.25	46 00	23 00	18,814 00	23,375 75	30,015 44
Dougherty, Davey & Dougherty	3	138	7	2	2	25	35	61	786.5	48 00	21 75	18,100 00	16,409 50	35,725 50
Davey, Tower & Co.	18	150	27	5	9	146	60	208	603	43 00	22 63	2,970 72	12,027 75	14,968 47
Eleventh Hour Mining Co.	2	55	1	2	5	6	11	4	14,049.25	44 00	20 00	191 00	317,934 52	343,568 78
Engineers' Mining Co.	2	180	1	2	5	6	11	4	2	...	20 00	...	40 00	161 00
Empire Zinc Co.	18	80	9	10	6	12	100	70	5,684.25	47 00	22 83	41,848 25	120,736 37	171,964 63
Euclid Mining Co.	2	75	2	2	1	1	6	10	676	...	22 00	...	14,872 00	14,872 00
Franklin Zinc Co.	15	75	10	9	2	117	15	132	1,455.50	45 00	20 82	11,160 00	30,471 98	30,471 98
Garrison Lead & Zinc Co.	8	160	8	2	2	1	35	5	1,522	48 70	19 87	14,989 10	34,473 30	46,633 30
Granby Mining & Smelting Co.	20	60	5	5	4	1	60	40	810.25	44 17	28 80	17,978 57	16,180 69	31,169 79
Granby Mining & Smelting Co.	30	110	10	5	1	60	80	140	4,998.50	47 00	22 50	2,780 00	116,228 10	134,201 67
Great Western Mining Co.	1	90	1	1	1	11	11	4	606.50	...	10 00	51 12	18,646 00	16,436 00
Guengerich, Kelley & Gregg.	3	140	1	2	1	7	10	17	421	48 00	21 50	51 12	4,210 00	10,863 62
Gunn & Loyd	2	55	2	4	1	18	12	17	236.5	41 00	22 00	49,680 25	48,415 41	93,095 64
Gretchen Lead & Zinc Co.	2	125	2	2	2	10	12	22	1,973.5	46 00	22 00	115 00	6,715 00	5,880 71
Hicks & Co.	2	50	1	1	4	4	8	1	269.8	...	22 00	77 31	357 60	1,434 81
Horne Mining Co.	2	60	1	1	1	6	5	9	16.35	...	21 80	...	1,254 07	1,254 07
Houghton & Son.	1	130	1	1	8	10	18	4	335.75	46 83	23 00	421 59	7,388 48	7,388 48
Hoff Mining Co.	1	80	2	6	6	8	14	4	214.3	...	23 00	...	4,928 90	5,850 49
Jasper & LaReine Lead & Zinc Co.	5	82	6	1	1	20	6	16	1,011.25	48 40	24 00	9.38	20,825 30	20,825 30
Joplin Syndicate (limited)	1	90	1	1	1	7	8	15	100	...	22 00	...	2,400 00	2,400 00
Kellar Mining Co.	1	120	1	2	2	20	6	12	17.3	48 00	22 00	9.38	1,380 05	1,380 05
Knoble Mining Co.	1	150	1	3	1	12	9	21	65	46 00	23 15	242 88	1,506 32	1,506 32
Knight, A.	3	90	2	3	1	6	4	10	784.4	48 00	23 00	25 10	18,355 00	18,355 00
Knoble Mining Co.	1	150	1	3	1	12	9	21	370	25 00	22 00	25 10	8,140 00	8,140 00
Lewis, J. F.	4	110	4	7	2	23	35	68	801.5	\$44 00	\$20 00	\$5,148 00	16,080 00	21,178 00
McCoy & Co.	23	65	7	7	2	47	58	108	882.5	47 22	20 70	2,238 22	18,368 78	39,563 00
Mahaska Mining Co.	1	50	2	3	1	16	10	26	320	44 00	20 00	115 63	6,400 00	6,400 00
Margerum Mining Co.	1	50	2	3	1	16	10	26	42	...	20 00	...	1,065 38	1,065 38
Midland Mining Co.	7	35	8	2	1	4	6	10	800	48 00	22 00	12,098 00	18,000 00	18,000 00
Mineral Creek Lead and Mining Co.	1	160	1	1	1	20	27	47	217.5	46 00	24 00	10,488 00	4,883 75	16,889 75
Monkey Hill	3	75	2	6	1	1	1	1	1349.5	46 00	24 00	10,488 00	33,062 75	33,062 75
Moonshine Mining Co.	10	70	2	2	2	18	18	38	1440	...	24 00	...	34,560 00	34,560 00
Mottley Mining Co.	2	150	2	2	2	2	2	2	...	...	...	...	...	...
Myers & Jemison.	1	150	1	2	2	15	15	30	...	...	...	...	...	...

JASPER COUNTY—Continued.

Name of person or company operating mine.	Shafts.		Machinery in use.				Employees.			No. of men prospecting		Total No. of tons mined.		Av. value per ton at mine.		Total amount received.		Total amt't received for the year's output of lead and zinc
	Number	Av. depth in feet.	Boilers	Pumps	Crushers.	Steam-jigs	Miners	Others	Total	Lead	Zinc	Lead	Zinc	Lead	Zinc	Lead	Zinc	
Nellie Bly Zinc Mining Co.	1	80	1	1			4	5	9	8	128	61.5	21.50	46.00	5,888.00	1,892.25	1,892.25	1,892.25
Nevada Mining Co.	2	105	2	2			12	14	26	6	128	750.5	20.50	45.00	5,888.00	15,610.40	21,498.40	21,498.40
Noble Mining Co.	3	180	1		1		15	10	25	4	244	425	21.00	45.00	10,980.00	8,925.00	19,905.00	19,905.00
North Joplin Lead Co.	4	40		2			6	7	13	4	64	52	21.00	46.00	3,860.18	1,890.12	5,750.30	5,750.30
North Joplin Lead Co.	2	65					6	7	14		1.5	52	22.50	47.00	61,795.00	45,618.00	107,413.00	107,413.00
Oaxero Mining Co.	2	80	8	6	1		4	15	55	20	1314	2027.5	22.50	46.00	1,435.20	2,102.76	3,537.96	3,537.96
Pat Murphy Lead	2	75					8	10	18	6	81.2	95.5	22.00	46.00	1,435.20	1,435.20	2,870.40	2,870.40
Pacific Mining Co.	2	160	1	1	1		10	5	15			600	24.00	46.00	15,600.00	15,600.00	31,200.00	31,200.00
Perry, W. B.	2	130	2	2			10	22	32	24	24.25	7.5	24.58	46.00	1,109.00	184.35	1,293.35	1,293.35
Pineard Mines	2	110	1	1	1		6	5	11	8	74	61	22.00	44.00	3,250.04	1,220.17	4,470.21	4,470.21
Porter, E. D.	1	110	1	1	1		15	12	27			1471.85	24.00	48.00	9,531.40	35,812.40	45,343.80	45,343.80
Rex Mining and Smelting Co.	25	90	21	6	3		20	95	175	60	178 1/2	794.5	24.00	48.00	5,639.96	19,050.87	24,690.83	24,690.83
Richland Mining Co.	1	145	2	1	2		22	28	50	15	822	1838.25	23.50	45.28	14,611.18	4,360.50	18,971.68	18,971.68
Rising Sun Mining Co.	1	202	1	1	2		1	10	21			138.75	25.00		4,720.87		4,720.87	4,720.87
Ruby Lead and Zinc Co.	2	75					6	8	14	2	11	120.5	24.00	48.00	525.92	2,880.00	3,405.92	3,405.92
Schraeder, J. B.	5	60	1	2	1	1	18	24	40	10	208.5	830	23.00	47.45	9,688.75	19,090.00	28,778.75	28,778.75
Schraeder & Doherty Lead and Zinc Co.	5	75	3	1	1		21	24	45			2868.5	24.00	48.00	5,231.92	68,736.24	74,078.16	74,078.16
Snyder Bros., Mining and Smelting Co.	5	70	1	8	1		10	8	18		105	1075	21.50	48.00	5,040.00	23,119.50	28,159.50	28,159.50
South Joplin Lead and Zinc Co.	3	140	5	5	2		10	12	22	2	75	438.5	22.00	46.00	35.70	10,237.75	10,273.45	10,273.45
Steelman, A. T. & Co.	1	150	1	1			6	12	18		8.50	288	22.00	45.00	884.75	6,292.55	6,677.30	6,677.30
Stirling Lead and Zinc Co.	4	100	3	4	1		15	20	35			528.5	24.00	46.00	3,237.50	12,636.00	15,873.50	15,873.50
Swanland Mining Co.	4	85	2	2	4		29	3	32	6	31.4	104.7	20.00	48.00	1,329.50	2,123.81	3,453.31	3,453.31
Tan-yard Hollow	3	60	2	2			8	8	16			108	20.00	48.00	1,329.50	2,123.81	3,453.31	3,453.31
The Standard Lead and Zinc Mining Co.	7	130	5	3	3		14	20	34	6	81.4	154.7	20.00	46.00	1,444.17	8,094.40	9,538.57	9,538.57
Tower, Davey & Co.	7	160					50	5	55			1109.2	20.50	48.00	11,921.16	30,501.90	42,423.06	42,423.06
Troup Mining Co.	6	186	7	5	6		54	78	132	249	249	6707	21.16	46.28	11,586.78	20,887.89	32,474.67	32,474.67
Tuckahoe Mining Co.	11	110	8	4	1		10	16	26	10	145.5	866.5	24.40	47.08	7,098.77	20,887.89	27,986.66	27,986.66
Turkey Creek Mining Co.	94	84	9	6	4		40	40	84		76.62	1921.20	24.61	46.00	8,478.75	47,294.10	55,772.85	55,772.85
Victor Mining Co.	2	195	3	4	2		32	25	57	1		4187.75	24.50		102,569.68	102,569.68	205,139.36	205,139.36
Viroqua Mines	1	110	2	6	1		6	10			11.75	1097	23.00	47.00	21,667.00	23,881.00	45,548.00	45,548.00
Windsor Mining Co.	5	112	5	2	2		20	18	38	6	461	1097	23.00	47.00	21,667.00	23,881.00	45,548.00	45,548.00
West Hollow Mining Co.	3	100	6	4	2		20	25	45	10		738	24.00	46.00	1,021.20	30,000.00	31,021.20	31,021.20
West Hollow Lead and Zinc Co.	3	105	4	4	2		15	5	20	2	284.25	104	24.00	46.00	12,165.50	2,496.00	14,661.50	14,661.50
Zinc Hill Mines (W. E. Goff)	5	123		2			15	5	20	2		106014	22.70	46.09	530,064.81	2,416,388.00	2,946,477.81	2,946,477.81
Totals	437		801	228	129	153	1949	1675	3624	763	11,500.95							

MILLER COUNTY.

Name of person or company operating mine.	Shafts.		Machinery in use.				Employees.			No. of men prospecting.		Total No. of tons mined.		Av. value per ton at mine.		Total amount received.		Total am't received for the year's output of lead and zinc	
	Number..	Av depth in feet..	Bollers...	Pumps...	Crushers..	Steam-jigs	Miners...	Others...	Total....	Lead.....	Zinc.....	Lead.....	Zinc.....	Lead.....	Zinc.....	Lead.....	Zinc.....		
Miller County Mining and Smelting Co.	25.1	...	48 00	...	1155 58	...	1155 58	...

NEWTON COUNTY.

Emille Zinc Co.	2	90	3	3	1	2	13	4	17	8	13.5	92.5	\$44 18	\$21 90	\$810 14	\$2,025 75	\$2,635 89
Fairbanks Mine	2	60	34	30	2	7	8	6	14	6	22.33	46 00	43 00	22 00	1,028 95	110,000 00	1,028 95
Granby Mining and Smelting Co.	40	90	1	1	1	1	164	45	209	164	800	5000.	48 00	23 50	84,400 00	110,000 00	144,400 00
Henderson Mining Co.	1	50	1	1	1	1	8	6	14	2	25.	40.50	46 00	16 00	1,150 00	931 75	2,101 75
K. D. F. Mining Co.	1	60	2	2	2	2	8	8	6	10.8	5	40	46 00	24 00	280 00	640 00	870 00
McClelland & Maupin.	2	110	2	2	3	2	8	7	15	308.5	4.75	2464.	46 00	18 00	473 57	114 72	473 57
Norton Land and Mining Co.	16	65	9	4	3	2	50	40	90	10	40.	20.	46 00	10 00	14,191 00	44,352 00	58,543 00
Roaring Springs Land and Mining Co.	5	80	2	5	1	1	10	10	20	10	5.	321.	48 00	24 00	1,840 00	900 00	2,040 00
Saginaw Lead and Zinc Co.	5	80	2	1	3	1	17	20	37	15	20.	160.	45 00	10 87½	288 88	12,505 20	12,742 08
Scotia Mining Co.	5	120	1	3	1	1	7	3	10	20.	20.	160.	45 00	10 87½	900 00	1,740 00	2,640 00
Seneca Lead and Zinc Co.	2	120	1	3	1	1	7	3	10	20.	20.	160.	45 00	10 87½	900 00	1,740 00	2,640 00
Totals	77	...	51	49	7	12	288	144	492	235	1249.63	3842.75	44 06	20 68	55,068 54	172,629 42	227,587 96

PERRY COUNTY.

Tucker, James H. S.	2	4	...	4	8	6.5	...	\$25 00	...	\$162 88	...	\$162 88
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ST. FRANCOIS COUNTY.

Doe Run Lead Co.....	2	{ 58 170 }	4	5	4	20	112	98	210	{ 2,900 }	\$43 00	124,700 00	\$124,700 00
Fiat River mine	1	{ 829 208 }	2	2	...	..	30	30	60	..	.....	.....	.....	.....	.....	.....	896,068 50
St. Joseph Lead Co.....	8	{ 140 250 }	14	6	10	110	255	23	231	29	20,840	.....	43 00	.....	896,068 50	.....	896,068 50
Totals.....	6	.....	20	13	14	130	397	154	551	29	23,740	.....	43 00	.....	1,020,798 50	.....	1,020,798 50

WASHINGTON COUNTY.

Abbyville Mining and Smelting Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	\$1,480 00
Bugg, J. P. & R. M.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,894 40
Flynn, John.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,313 00
Higginbotham, Z. F.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6,440 00
Long, James.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4,664 00
Long, Wm.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	246 40
Moran, Chas.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3,741 33
Palmer Lead Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27,600 00
Shibboleth Lead and Mining Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,404 00
Union Mining and Smelting Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13,015 20
White, Mrs. L. J.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,290 00
Totals.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1793.63	.....	45 55	.....	81,068 33	.....	81,068 33

TABLE XV—COMPARATIVE TABLE OF OUTPUT OF LEAD AND ZINC MINES, 1889 TO 1892 INCLUSIVE.

County.	Number of tons mined.				Total amount received for the output of lead and zinc ores for year ending June 30, 1892...				
	Lead.				Zinc.				
	1889.	1890.	1891.	1892.	1889.	1890.	1891.	1892.	
Barry.....		30	20	84	180	30	575	192.50	\$6,952.62
Christian.....		46	87.5	35	174	1,647.3	40	103.50	1,810.00
Cole.....	55		231	150			1,373.6		4,029.25
Dade.....			200.1	406.11	628	552.9	1,071.1	898.60	6,800.00
Franklin.....		840.6	7,994	11,500.95	59,162	74,141.4	95,376	106,014.01	37,444.05
Greene.....	6,330.2	7,159.8	497	412.60	2,065	2,614	2,116	2,075	2,946,477.31
Jasper.....	309	277	4,481.61	5,720.90	13,027.5	12,877.1	15,392.62	13,861.28	45,020.85
Jefferson.....	1,231.3	2,573.4	3,431.31	4,403.25	15.5		40		488,537.54
Lawrence.....	*3,715	*3,032.6	8	25.10					189,339.75
Madison.....		4.5							1,155.68
Morgan.....		12	14.5						
Miller.....		1,757.5	1,504.6	1,349.63	6,990.2	8,235.4	7,900.7	8,342.75	227,857.96
Moniteau.....	1,863.3		15	6.50					162.88
Newton.....		*16,900	*16,537.5	23,740					1,020,788.50
Perry.....	*19,464.7								81,088.33
St. Francois.....	{ 560	454	1,850.25	1,733.63	125				
Washington.....	*2,260.5	*513.8	16,925.19	49,626.42					
Lead.....	9,489.3	12,909.2	19,968.81						
*Pig lead.....	25,440.2	20,451.4							
Totals.....	84,909.5	33,360.6	98,894		82,357.2	100,243.1	123,753	131,487.64	\$5,036,504.62

*Where the output for the year just closed has been smelted, we have estimated not on pig-lead, but lead ore, basing the price fixed on the ore upon prices received by other parties on mineral of like character.

ACCIDENTS IN LEAD AND ZINC MINES,

For the year ending June 30, 1891.

No feature of the table on accidents in lead and zinc mines stands out more prominently than the small and unreasonable number of non-fatal, as compared with fatal accidents accounted for in this table. That this will so appear to all who are familiar with the mining business is expected; for the usual proportion of fatal and non-fatal accidents is in this table reversed. We would not have it understood that we regard the figures given as to the number of non-fatal accidents as correct, for in fact we are decidedly of the opinion that the number falls far short of the actual number injured. We have to offer in excuse for this seeming discrepancy the fact that in the great majority of the cases herein reported, no report was sent us, as is required of mine operators under the laws of the State. The fact is that in most instances we have been compelled to seek our information from outside sources, and from careful scrutiny of the newspapers of certain sections of the State, with a view of discovering mine accidents.

When we find an accident has occurred at a mine—if the time and opportunity permits—we make it a point to visit the scene of the accident; if not, we always mail a blank to the mine operator, requesting that the same be filled out and mailed to us. This blank contains questions which, if properly answered, give us a fair account of the cause of accident, and other information necessary concerning the injured party. In some cases, we are sorry to state, mine operators ignore our request; we are then compelled to resort to newspaper accounts, and such information as we can obtain from parties who may be familiar with the accident, to obtain the data we do get.

If our report on non-fatal accidents may be regarded by some as incomplete, the cause of it must be chargeable to those whose duty it is to furnish us the information, not only as to fatal but non-fatal accidents as well. It is impossible for us, with our limited facilities and the time at our disposal, to visit the scene of each accident. Could we induce operators to give this matter that attention which the law demands of them, our record will prove as correct as the data furnished will allow of.

From the table referred to, it will be found that during the year ending June 30, 1892, there were 11 non-fatal and 18 fatal, or a total of 29 accidents.

31% of the accidents was due to men falling down shafts. (We have already referred to the necessity of greater protection around shafts and in hoisting facilities. What better argument can we offer than these figures?)

27% of the accidents is due to falls of roof.

14% from machinery.

10% from blasts.

10% from thawing or warming dynamite.

This thawing of dynamite is a serious business, and miners should take warning. It has been demonstrated beyond the question of doubt, that dynamite is much more easily exploded when warmed than otherwise. And again, there are very many instances, aside from those shown in our table, where dynamite has exploded while undergoing the warming process, with no apparent cause therefor other than the simple fact of its being warmed.

TABLE XVI—RECAPITULATION OF LEAD AND ZINC-MINE ACCIDENTS.

Number of non-fatal accidents.....	11	
Number of fatal accidents.....	18	
Total number of accidents.....	29	
Number of single men killed.....	10	
Number of married men killed.....	8	
Total number killed.....	18	
Number of wives made widows.....	8	
Number of children made fatherless.....	21	
Number of men fatally injured that were insured.....	8	
Amount of insurance.....	\$8000 00	
Cause of accidents and number injured—		
From falling down shaft.....	9	
From falls of rock.....	5	
From machinery.....	4	
From thawing out dynamite.....	3	
From blasts.....	3	
*From cave-in.....	3	
From being knocked off platform.....	1	
From breaking of rope hook.....	1	
Total number injured.....	29	
How the injured men were employed—		
Miners.....	15	
Laborers.....	4	
Prospectors.....	2	
Spectators.....	2	
Superintendents.....	3	
Proprietor of mine.....	1	
Mine boss.....	1	
Hoisting engineer.....	1	
Total.....	29	

* Cave-in properly belongs under head of "Fall of Roof;" but the interest attaching to this accident, due to the burying alive of three men and the extra and expensive effort to recover the bodies, is our excuse for leaving the accident under same heading as reported to us.

TABLE XVII—SHOWING ACCIDENTS IN LEAD AND ZINC MINES IN MISSOURI, BY COUNTIES.

JASPER COUNTY.

Name of employer.	Name of employee.	Occupation.	Age.	Single	Married	No. of children	Non-fatal.	Fatal.	Was the injured party insured?	Amount of insurance	Nature of accident.	Coroner's verdict.
Empire Zinc Co.	Ascraft, E. S.	Miner	40	1			1				Fall of rock	No inquest
Rose, D. M. & Co. (Carterville)	Barrington, J. E.	"	33	1			1				Explosion of dynamite while warming same	"
"	Crane, J. F.	"	36	1	4		1				Explosion of dynamite while warming same	"
Chapman & Co.	Clark, A. J.	Miner & con'r	34				1				Explosion of dynamite while warming same	"
Illinois & Missouri Lead & Zinc Co.	Clark, Frank	Miner	20	1				1			Fall of machinery	Unavoidable accident.
Motley Mining Co.	Eaton, John	Holting eng	33	1				1			Run loaded car in shaft	Came to his death by his own carelessness.
Troup Mining Co.	Eulett, Chas. H.	Spectator	28	1				1			Cave-in	"
Page, D. M.	Hamlin, James	Miner	35	1	8			1			Knocked off platform.	"
Franklin Mining Co.	Hardisty, M.	Superintendent	23	1				1			Fell down shaft.	No inquest
Clark & Ivey	Johnson, James	Laborer	23	1				1			Killed by blast.	"
Johnson, John	Leise, John	"	23	1				1			Fell down shaft.	"
Bay State Lead Co.	Leggett, Thos	Miner	60	1				1			Fell down shaft.	Accidental falling of rock or slate, mine No. 7, E. Z. Co.
Empire Zinc Co.	McKinney, Henry	"	43	1	5			1		\$1000	Fall of rock	"
	McDowell, Albert G.	"									Thrown from tub down shaft	"
Pacific Mine.	Mitchell, Geo.	M. (ac's supt)	35				1				Cave-in	Accidental
Troup Mining Co.	Roach, Harry D.	Gen. manager	24	1				1			Breaking of rope-hook	No inquest.
Phillips, Palmer & Co.	Stewart, Andrew	Miner	23	1				1		1000	Fell down shaft.	No inquest.
Center Creek Mining Co.	Snodgrass, J. W.	"	30	1	2			1			Fell down shaft.	"
Oswego Mining Co.	Stork, R. M.	"	35	1				1			Killed by blast	No inquest.
Thelass & Escott	Thelass, John	"	26	1				1				
			9	5	14	6	14	2		2000		

LAWRENCE COUNTY.

Brinkerhoff Mining Co.....	Cook, F. M.....	Miner.....	58	1	2	1	1	1	Caught by machinery.....	No Inquest.....
Dillard & Co. (Watson mine).....	Dougherty, John.....	Own'r of shaft.....	52	1	5	1	1	1	Killed by blast.....	
Louisville L. & Z. Min'g & Smlt. Co.....	Lawyer, Edward.....	Miner.....	26	2	7	1	2	1	Fell 110 feet into 15 feet of water.....	
			..	2	7	1	2	1		

ST. FRANCOIS COUNTY.

Doe Run Lead Co.....	Johnson, E. H.....	Miner.....	32	1	1	1	1	1	Fall of rock.....	Death caused by his own negligence.....
St. Joseph Lead Co.....	Libby, Chas.....	Mine boss.....	50	1	1	1	1	1	Fell down shaft.....	No Inquest; Justice of the peace thought it unnecessary.....
	Link, John.....	Car loader.....	34	1	1	1	1	1	Killed by rock falling from bluff.....	
	Lunsford, Granville.....		1	1	2	2	1	1	Injured by rock falling from bluff.....	

WASHINGTON COUNTY.

Palmer Lead Co.....	Blount, Peter.....	Visitor pros.....	24	1	1	1	1	1	Slot got out of gear.....	
	Crompton, Daniel.....		20	1	1	1	1	1		
				2	2	2	2	2		

FATAL ACCIDENTS IN LEAD AND ZINC MINES,

For the year ending June 30, 1892.

JASPER COUNTY.

J. E. Barrington and John T. Crain, miners employed at D. M. Rose's prospect shaft on the Cornfield lands, were suddenly killed Dec. 21, 1891.

The following is a copy of the coroner's verdict:

We, the jury, in the inquest over the bodies of J. T. Crain and J. E. Barrington, find that the deceased came to their death by suffocation in the Johns shaft on the Cornfield land at Carterville, Mo., caused by the explosion of giant powder placed about the stove in the derrick-house by J. E. Barrington, and the burning of said house.

JAMES PETERS,
THOS. BROWN,
L. M. BALDWIN,
N. N. BURKHARDT,
JAS. DUNLAP,
J. H. CALDWELL.

It appears that the two men were working in the bottom of a shaft 120 feet deep, over which was erected a derrick-house and board shanty 10×10 feet in size. Prior to descending the shaft, one of these men left some frozen dynamite near the stove in this derrick-house to thaw out, with the understanding that at a given signal it was to be lowered to them by the hoisterman. The dynamite exploded in the thawing process (as is often the case), and, knocking over the stove, set fire to the derrick-house and resulted in suffocating the unfortunate men in bottom of shaft.

A. J. Clark, a miner and contractor at the mines of Chapman & Co., lot 91, Cornfield land.

Mr. Clark and his brother were sitting on a log waiting for some dynamite to thaw out which had been placed near a fire some little distance from where they were sitting. The dynamite exploded, and the log upon which the brothers were sitting, it is claimed, was blown a distance of 30 feet and broken in two. Mr. A. J. Clark had his left leg blown off at the thigh and died directly after the explosion. His brother escaped without serious injury.

Frank Clark, a miner, was killed at the pump-shaft of the Illinois and Missouri Zinc Co. March 11, 1892. The miners were at work releathering the pump, and Frank Clark, one of them, was standing on

a platform in the shaft working on a plunger which had been drawn up and held above him with a chain. The men above were just in the act of lowering the plunger when the chain broke, and a heavy iron wheel from the cross-head fell into the shaft. Clark was knocked off the platform and fell to the bottom of the shaft. He was instantly killed. The coroner's jury rendered a verdict of "death by accident."

John Eaton, a hoisting engineer employed by the Motley Mining Co., was killed by falling down the shaft. The verdict of the coroner's jury was, "death from his own carelessness."

From further information obtained, it would appear that the engineer, supposing the cage was at the landing (he having forgotten to run the cage to the landing), run a loaded car into the shaft and was pulled in after it. We wrote the Motley Co., recommending that guard-rails be placed around the shaft, and that automatic gates be put up. It was with pleasure we noted the company's prompt compliance with our recommendation. Just here, we respectfully call the attention of mine operators to this most important matter. It is a fact, that the majority of shafts in this county are without any protection whatever in preventing accidents of the above nature. Had the Motley Co.'s shaft been provided earlier with its present guard-rail and gates, this accident would more than likely not have to be recorded.

The cost of providing these safeguards is small, when compared with the delay and inconvenience occasioned by an accident, aside from the far more important question of human life, widows and orphans.

Harry D. Roach, Chas. Eulitt and James Hamlin, were all hurled to death by a cave-in at the Troup Mines on 18th of May, 1892.

Mr. Roach was superintendent of Troup Mining Co., Messrs. Eulitt and Hamlin were spectators. Some two years ago this part of the mine where the cave-in occurred was abandoned because of the bad roof encountered. This roof began to fall, and continued to fall until it reached the surface. It was while Mr. Roach was superintending the filling up of the hole made by this cave-in, and at the time in conversation with the two unfortunate spectators, that all three were carried, by a slide of a large slab of earth, suddenly and without warning, to a bench some 75 or 80 feet below. This break was soon followed by another slab of enormous size, burying the unfortunate men beneath at least 35 feet of earth. Numerous parties witnessed the sad affair, but owing to the treacherous surroundings, none dared venture near the brink. The bodies of these three men, up to this writing, have not been recovered, though every effort has been put forth to this end.

We understand that a contract has been made with Mr. Leckie, of Joplin, to hoist the material out of this cave-in until the bodies are reached.

John Leise, a miner working for Clark & Ivey, was instantly killed by an explosion of 11 sticks of dynamite. Mr. Leise had prepared a shot and lighted the fuse, but it failing to fire, he went back and put in another stick of dynamite and fired it, but only this last stick exploded; he again returned to see what was the trouble, and just as he reached the shot-hole the entire load fired, filling his body with rock.

Thomas Leggitt, a laborer, was at work for Mr. John Johnson on the Cook farm. He was engaged in putting in some timbering in a shaft, and from some cause unknown to any one, he fell 50 feet to the rock below, killing him instantly.

Henry McKinney, a colored man about 60 years of age, fell into a shaft on the Bay State land. He was engaged in sinking a shaft, and in some unexplained manner fell to the bottom of shaft. He did not regain consciousness, and as no one witnessed the accident, further particulars could not be had.

Albert G. McDowell, a miner employed at mine No. 7 of the Empire Zinc Co., was killed by a fall of rock.

Messrs. McDowell, Ashcraft and Deems were at work stopping in a drift which had been driven from the top of a chamber reached by an incline from the shaft. Ashcraft was cutting at the head of the drift, McDowell was shoveling the dirt to the platform in the chamber, and Deems, the ground-boss, was shoveling it down into the lower drift, when a huge slab of rock 6 feet long, 3 feet wide and 2 feet thick, fell from top of the drift, crushing McDowell to the platform. A verdict of "accidental death" was rendered by the coroner's jury.

Andrew Stewart, a miner employed at Phillips & Co.'s mines was killed by falling down a shaft.

Stewart, it appears, was being lowered down the shaft to his work when the rope-hook broke, causing him to fall a distance of 70 feet, and killing him instantly. It is claimed by the company that the hook was made of $\frac{3}{4}$ -inch Norway iron, and had been used only a short time. Other parties, however, claim that the hook had an old break in it, plainly visible.

The coroner's jury returned a verdict of "unavoidable accident."

J. W. Snodgrass, a miner working for the Centre Creek Mining Co., was killed by falling down a shaft.

The substance of the information obtained goes to show that Snodgrass, accompanied by a man whose name we failed to get, got into the tub at the same time to be hoisted to the top, and that when about 100 feet or more from the bottom, from some cause not definitely known, Snodgrass fell from the tub, receiving injuries that proved fatal—as he lived only a few hours after the accident.

John Theiss, a miner working for Theiss & Escott, was killed by a blast.

Mr. Theiss had loaded and set fire to a mine-shot. It failing to go off in what he evidently considered reasonable time, he went back to reload, when the shot exploded.

No inquest was held.

LAWRENCE COUNTY.

F. M. Cook, a miner and operator at work on the Brinkerhooft Mining Co.'s land, was killed by being caught in the machinery. Mr. Cook was caught by a set-screw on line shaft which runs crusher, pulled around the shaft and thrown to the ground. Shafting moved about 2½ feet above the ground, and one of the braces at each revolution struck him.

No inquest was held.

John Dougherty, mine operator at the Watson mines, was killed by a blast March 12, 1892. It was quitting time for the miners. Dougherty was standing at the mouth of shaft in conversation with his partner, and waiting for the men at work below to come to the top, when one of the men below cried out: "We are going to set off some shots." Dougherty remarked to his partner: "I believe I will go down and see the result of the shots." He started down the shaft, and when he reached the bottom the first shot went off with great force, and flying pieces of rock struck him full on the right side of his head, killing him instantly.

ST. FRANCOIS COUNTY.

Charles Libby, a mining boss of the Doe Run Lead Co., fell a distance of 140 feet in a shaft located on Flat river. Mr. Libby had been to the top of shaft to bring down some timber, and he had descended in a tub to a platform constructed in the shaft where some repairs were being made. As he stepped out of the tub he missed the platform and fell through a hole which had been left in same, to the bottom. Death was instantaneous.

John Link, a car loader employed by the St. Joseph Lead Co., was struck by a rock falling from the bluff and killed.

The coroner thought under the circumstances an inquest was unnecessary.

BARRY COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Allen Starke & Co....	Peirce City (Law'ce Co)	Peirce City.....

COLE COUNTY.

Woodworth, J. D.....	Enon.....	Enon.....
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DADE COUNTY.

Corry Mining Co.....	Greenfield.....	Greenfield
Pemberton Mines.....	"	"
Southwestern Mining Co.....	Everton.....	Everton.....

FRANKLIN COUNTY.

Bartle, J. H	St. Clair.....	St. Clair
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GREENE COUNTY.

American Mining Co.....	Springfield	Mumford
Bay State Mining Co.....	Ash Grove.....	Ash Grove.....
Goetz Mining Co.....	"	"
Gumbo Mining Co	Springfield.....	Mumford
Hurt, J. A. (ore-buyer)	Ash Grove.....	"
Murray & North.....	"	Ash Grove.....
Nixon & Holmes.....	Everton (Dade county)	.....

JASPER COUNTY.

Alba Company	Alba.....	Alba.....
Alba Mining Co	"	"
All Gall Mining Co	Webb City.....	Webb City
American Bull Pup Mining Co	Joplin	Joplin
Ashcraft, Reynolds & Co.....	Webb City.....	Webb City
Barbee Mining Co.....	Joplin	Joplin
Bradley, E. E.	Webb City	Webb City.....
Burch Mining Co	Scotland.....	Scotland.....
Byers, Murphy & Connor.....	Joplin	Joplin
Carthage Mining Co.....	Carthage	Edwin Station.....
Cave Springs Mining Co.....	Joplin	State line Mo. and Kas
Center Creek Mining Co.....	Webb City.....	Webb City
Chatham Mining Co	"	"
Cherokee Mines	Joplin	Carterville

JASPER COUNTY—Continued.

Name of operator or company.	Postoffice.	Mine located near
Copley, J.	Zincite	Zincite
Cora Latta Land and Mining Co.	Joplin	Joplin
Daugherty & Davey	Cartersville	Cartersville
Daugherty, Davey & Daugherty	"	"
Davey, Tower & Co.	"	"
Eleventh Hour Mining Co.	Webb City	Webb City
Engineers' Mining Co.	Joplin	Bet. Joplin & Webb C.
Empire Zinc Co.	"	Joplin
Euclid Mining Co.	Galena, Kas.	State line (Jasper Co.)
Franklin Zinc Co.	Lehigh	Lehigh
Garrison Lead and Zinc Co.	Webb City	Webb City
Granby Mining and Smelting Co.	Joplin	Joplin
	Oronogo	Oronogo
Great Western Mining Co.	Joplin	Joplin
Guengerich, Kelley & Gregg	"	"
Guinn & Loyd	"	"
Gretchen Lead and Zinc Co.	"	Zincite
Hicks & Co.	"	Joplin
Home Mining Co.	"	"
Houghton & Son	Webb City	Webb City
Hoff Mining Co.	Joplin	Zincite
Jasper & LaReine Lead and Zinc Co.	"	Joplin
Joplin Syndicate (limited)	"	"
Keller Mining Co.	Cartersville	Webb City
Knight, A.	Carl Junction	Carl Junction
Knoble Mining Co.	Zincite	Zincite
Lewis, J. F.	Webb City	Webb City
McCoy & Co.	Joplin	Joplin
Mahaska Mining Co.	"	"
Margerum Mining Co.	Webb City	Webb C. & Oronogo
Midland Mining Co.	Galena (Kas.)	State line, Jasper Co.
Mineral Creek Lead and Mining Co.	Joplin	Sherwood
Minneapolis and Webb City M. Co.	Webb City	Webb City
Monkey Hill (J. S. Casey, prop'r.)	Joplin	Joplin
Moonshine Mining Co.	"	"
Motley Mining Co.	Cartersville	Cartersville
Mound City Mining Co.	Webb City	"
Myers & Jemison	Carthage	Carthage
Nellie Bly Zinc Mining Co.	St. Louis	Joplin
Nevada Mining Co.	Webb City	Webb City
Noble Mining Co.	"	"
North Joplin Land Co.	Joplin	Joplin
North Heights Mining Co.	"	"
Oswego Mining Co.	"	"
Pat Murphy Land	"	Zincite
Pacific Mining Co.	Carthage	Carthage
Perry, W. B.	Joplin	Cartersville
Pincard Mines	"	Joplin
Porter, E. D.	"	"
Porter Mining Co.	Carthage	Carthage
Rex Mining and Smelting Co.	Joplin	Joplin
Richland Mining Co.	Webb City	Cartersville
Rising Sun Mining Co.	Joplin	"
Ruby Lead and Zinc Co.	"	Joplin
St. Charles Lead and Zinc Co.	Zincite	Zincite
Sargent, J. B.	Joplin	Joplin
Schrader & Doherty L. and Z. Co.	"	Blendeville
Snyder Bros. Mining & Smelting Co.	"	Joplin
Sophie I. Mining Co.	"	"
South Joplin Lead & Z. M. Co.	"	"
Standard Lead & Zinc Co.	Joplin	Zincite
Steelman, A. T. & Co.	Webb City	Webb City
Sterling Lead & Zinc Co.	Joplin	Joplin
Swarland Mining Co.	"	"

JASPER COUNTY—Continued.

Name of operator or company.	Postoffice.	Mine located near
Tan-yard Hollow		"
Tiffin Mining Co.	Webb City	Webb City
Tower, Davey & Co.	Carterville	Carterville
Troup Mining Co.	Webb City	"
Tuckahoe Mining Co.	Joplin	Joplin
Turkey Creek Mining Co.	"	"
Victor Mining Co.	Webb City	Webb City & Carterv.
Viroqua Mines	Joplin	Joplin
Wauchusetts Mining Co.	Carl Junction.	Carl Junction
West Hollow Mining Co.	Zincite	Zincite
West Hollow Lead & Z. M. Co.	Joplin	"
Windsor Mining Co.	Kansas City	Joplin
Zinc Hill Mines (W. E. Goff)	Joplin	"

JEFFERSON COUNTY.

Valle Mining Co.	Valle Mines	Valle Mines
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LAWRENCE COUNTY.

Aurora Zinc Co.	Aurora	Aurora
Berry, Frank	"	"
Black Land Mining Co.	"	"
Brinkerhoff Mining Co.	"	"
Cleveland & Aurora Mineral Land ..	"	"
Dayton, C. M., Lead and Zinc Mines	"	"
Decatur Lead and Zinc Co.	"	"
Elliott, S. G.	"	"
Kentucky Mining Co.	"	"
Liles', T. J., Land	"	"
Louisville Lead and Zinc Mining Co.	"	"
Midland Mining Co.		
Nevada Gem Mining Co.	Aurora	"
New York Land and Mining Co.	"	"
Ozark Range Mining Co.	"	"
Peirce Mining Co.	Wentworth(NewtonCo)	Wentw'th (Newt.Co.)
Rinker Lead and Zinc Co.	Aurora	Aurora
Schmook Mining Co.	"	"
Seamon Mining Co.	"	"
St. Louis & Aurora Mining Co.	"	"
Stotts City Mining Co.	Mt. Vernon	Mt. Vernon
Wood, Harry, Mining Co.	Aurora	Aurora

MADISON COUNTY.

Rowland, Hazard	Mine LaMotte	Mine LaMotte
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MILLER COUNTY.

Miller County Mining and Smelt. Co.	Tuscumbia	Tuscumbia
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NEWTON COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Emilie Zinc Co.....	Joplin (Jasper county).	Joplin
Fairbank's mine.....	"	"
Granby Mining and Smelting Co....	St. Louis	Granby
Henderson Mining Co	Racine	Racine
K. D. F. Mining Co	Newtonia	Newtonia
McClelland & Maupin.....	Joplin (Jasper county).	Joplin
Newtonia Valley Mining Co.....	Newtonia	Newtonia
Norton Land and Mining Co.....	Joplin (Jasper county).	Joplin
Purdy & Jones	Wentworth	Wentworth
Roaring Springs Land and M. Co...	Joplin (Jasper county).	Joplin
Saginaw Lead and Zinc Co.....	Saginaw	Saginaw
Scotia Mining Co	Joplin (Jasper county).	Joplin
Seneca Lead and Zinc Co.....	Seneca	Seneca
The Ritchey Ranch Mining Co	Newtonia	Newtonia

PERRY COUNTY.

Tucker & Co.....	Silver Lake.....	Silver Lake.....
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ST. FRANCOIS COUNTY.

Doe Run Lead Co.....	Doe Run.	Doe Run & Flat river.
St. Joseph Lead Co.....	Bonne Terre.....	Bonne Terre.....

WASHINGTON COUNTY.

Abbyville Mining and Smelting Co..	Sullivan (Franklin Co.)	Sullivan
Bugg, J. P. & R. M.	Potosi	Potosi
Flynn, John	Richwoods	Richwoods
Higginbotham, Z. F	Fertile	Fertile
Long, James	Potosi	Potosi
Long, Wm	"	"
Moran, Chas	Richwoods	Richwoods
Palmer Lead Co	Palmer	Palmer
Shibboleth Lead and Mining Co	Cadet	Cadet
Union Mining and Smelting Co.....	Old Mines.....	Old Mines.....
White, Mrs. L. J	"	"

**MINING RULES OF THE ST. LOUIS-AURORA MINING CO.
OF AURORA, MISSOURI.**

Notice is hereby given, in accordance with the provisions of Chapter No. 115 of the Revised Statutes of the State of Missouri, of 1889, on "Mines and Mining," that the undersigned, St. Louis-Aurora Mining Co., "a corporation organized under the laws of the State of Missouri," has made and does hereby make and publish the following statement of the terms, conditions and requirements upon which the following mining lands, owned, leased or controlled by said company, may be prospected and mined, said lands being the east $\frac{1}{2}$ of the west $\frac{1}{2}$ of the southwest $\frac{1}{4}$ of section 8, township 26, range 25, and the following described land: Beginning at the northwest corner of the northeast quarter of the southwest quarter of section 8, in township 26, range 25, thence south one hundred and sixty rods, thence east fifty rods, thence north one hundred and sixty rods, thence west fifty rods to place of beginning, containing 50 acres, and such other tracts of land as may hereafter be acquired by the St. Louis-Aurora Mining company.

RULE 1. Any person desiring to mine on said land shall first obtain the consent of the superintendent, which being obtained, he shall sign his name to the company's register, opposite the number of lot on which he proposes to mine, which will subject him to the rules herein obtained. The right to mine upon any lot shall commence from the date of such signature.

RULE 2. Parties mining on any lot or lots agree to work the same faithfully and continuously in good workmanlike manner, and be guided by the instructions of the superintendent, and agree that a shaft shall be sunk on each lot held by them under lease; and should they fail to work the same three days in each calendar week, or violate any of the provisions of these rules, without written permission from this company, the same shall work a forfeiture of any and all rights and claims to said lot or lots, and the company may enter and take possession without any previous demand, notice or legal proceedings whatsoever, and may use all necessary force to do so. It is agreed that neither the company, its officers, agents nor employes shall in any manner be liable to any damages for such force used.

RULE 3. No sub-leasing or renting of lots will be allowed without written consent of the company. No transfer of lots or mining claims or rights will be recognized by the company unless the parties purchasing or acquiring such lots, claims or rights have received permission from said St. Louis-Aurora Mining Co. to mine such lots or claims.

RULE 4. All shafts or drifts must be held up in good shape, and where timbers are required they must be put in in good workmanlike manner, and extraordinary sized drifts must not be cut until approved by the superintendent of the company, who will have the right to enter at any time and inspect any mine on the company's land, and to stop the work of any parties who are not mining in a safe and workmanlike manner, and are not keeping their ground in a safe condition for the proper holding up of the land.

RULE 5. All ores must be cleaned in first-class order, and they must be cleaned and made ready for market on the lands of the company.

RULE 6. The company reserves the right to use the surface of the lands in erecting wash places, tramways, spouting, or machinery of any kind, or for any purpose that will not interfere with the working of such lands. No parties, other

than the company, or parties authorized by it, are to use such surface for other than mining purposes.

RULE 7. The royalty paid the company on all minerals taken from their lands shall be 25% ; but until there is a pump or pumps in operation on such tracts by the company, or some one authorized by the company, a rebate of 5% will be allowed from the above royalty.

RULE 8. Miners will be allowed to receive bids for ore from responsible buyers that are authorized to purchase ore on the company's land—the company reserving the right to keep the ore at the highest bid: provided, in all cases all ores must be weighed on the company's scale, or scales designated by the company, and payment made to the company, who shall settle with the miners, first deducting the royalty as above provided, and any claims the company has for advances made or supplies furnished.

RULE 9. Water in a shaft will hold a lot only at the option of the company.

RULE 10. No property right shall be acquired by any miner to any ore on or in said land, except the price or value of mining and cleaning the same.

RULE 11. No rock, sand, gravel, chats or wash-dirt shall be removed from these lands without permission of the company.

RULE 12. All leases under these rules expire April 1, 1895.

H. G. NOEL,

H. H. WERNSE,

Secretary.

President.

I hereby select lot No....., subject to the above rules and regulations.

.....

GLOSSARY

OF MINING TERMS USED IN MISSOURI IN MINING AND SMELTING LEAD AND ZINC ORES.

- Air-furnace**—A reverberatory furnace used to smelt lead in.
- Air-pipe**—A pipe made of canvas, or a wooden box, used in conveying ventilation to the workmen.
- Air-way**—Any passage used for the passage of the air current.
- Belgian zinc furnace**—A furnace for the production of zinc in which the calcined ore is distilled in tubular retorts.
- Black damp**—Choke damp; carbonic acid gas (CO_2), often found in the bottom of shafts and old unventilated workings. It will not support combustion.
- Black-jack**—Zinc blende.
- Blow-fan**—A small centrifugal fan used to force air through canvass pipes or wooden boxes to the workmen.
- Blown-out shot**—When a blast blows out the tamping without bringing down the ore, it is said to be a blown-out shot.
- Bottom**—The landing at the bottom of the shaft or slope; the floor; the bottom rock or stratum underlying the ore deposit.
- Breast**—The heading from which the ore is being mined.
- Bucking ore**—Hand process of crushing ores which do not occur free.
- Calamine**—Zinc silicate—carrying 52 per cent of zinc when pure.
- Calcoine furnace**—A furnace used for roasting ore in order to drive off certain impurities.
- Cave, or cave-in**—After the ore has been excavated the overlying roof gives way and falls and is called a cave-in.
- Chats**—1. The gravel-like tailings derived from the concentration of ores; 2. A low-grade ore, often too poor to handle; the refuse from concentration works.
- Charge**—The amount of materials added to the furnace at one time.
- Chert**—A silicious rock—often the gangue of lead and zinc.
- Cribbing**—Timbering 'a shaft with crib-work, commonly extends from surface down to the bed rock.
- Concentrating plant**—A complete plant for cleaning and preparing the ore for market, consisting of crushers, rolls and jigs.
- Crop, or out-crop**—Indications of an ore deposit sometimes observed upon the surface.
- Crusher**—A machine used for crushing ores and rock.
- Cotton rock**—1. Decomposed chert. 2. A variety of earthy limestone.
- Derrick**—The structure erected to sink a drill hole, and the frame work above shafts are sometimes called by this name.
- Digging**—Mining operations, excavating the ore or earth.
- Dip**—The angle of inclination of a mineral bed or vein measured from a horizontal line.
- Drill**—Any tool used for boring or drilling holes in rock or mineral.
- Dry bone**—Carbonate of lead.
- Dump**—A pile or heap of ore or waste, rock etc.
2. The tippie by which the cars or ore buckets are dumped.
- Entry or drift**—A water-level heading driven from the surface or bottom of shaft, through which the product is conveyed.
- Face, or working face**—The place at which work is being done; the ore-bearing stratum.
- Flint**—Chert rock.
- Flintshire furnace**—A kind of reverberatory furnace used for smelting lead ores.
- Float ore**—A term applied by miners to ore found loose in the clay or soil.
- Flux**—Iron ore, limestone and sand which are added in various proportions to the charge in a furnace to make the gauge melt up and blow off easily.
- Galena**—Lead sulphide, an ore carrying 86 per cent of lead, when pure.
- Hard lead**—Lead containing certain impurities, mainly nickel, cobalt, antimony, etc.
- Hoister**—A machine used in hoisting the product. It may be operated by steam or horsepower.
- Jack**—Zinc blende.
- Jig**—A machine used for separating ores from worthless rock by means of their difference in specific gravity.
- Lagging**—Small round timbers, slabs or planks driven in behind the legs and over the collars to prevent peices of the roof or sides from falling through.
- Legs**—Props on which collars in gangways rest.
- Mill cinder**—The slag from the puddling furnace of a rolling mill, used as a flux in lead smelting.
- Mill run**—The test of a given quantity of ore by actual treatment in a mill.
- Matte**—A compound of iron and other metals with sulphur, formed during lead smelting, in the slag furnace.

Mine—Any excavation made for the extraction of minerals.

Miner—This term is used to denote the workmen who mine the ore.

Mineral—A local term for galena or lead ore.

Mundio—Iron pyrites; bisulphide of iron.

Open cut—Any surface excavation.

Opening—A fissure or cave is often encountered in mining in the southwestern part of the State, and is locally known by this name.

Output—The mineral product of a mine.

Pebble jack—Zinc blende in small crystals or pebble-like forms that is not attached to rock, but is found in clay openings in the rock.

Percussion table—A kind of jolting table used in separating very fine ore from allmes.

Pillar—A portion of ore left to support the roof
Plat or map—A map of the surface and underground workings, or of either; to draw such a map from surveys.

Poling—The process of purifying lead by stirring it while melted with green poles, and skimming off the dross that rises to the surface.

Post or prop—Any upright timber: applied particularly to the timbers used for propping the roof.

Prospect hole—Any shaft or drill hole put down for the purpose of prospecting the ground.

Rolls—Machinery for reducing disseminated ores, so the minerals can be separated from the waste.

Roof—The rock or stratum overlying the ore deposit or vein.

Seam—A fissure or joint, either empty or filled with foreign matter. 2 A stratified bed of minerals.

Screen—Any sieve, whether coarse or fine mesh or bars, or perforated sheet metal, used for separating minerals into different grades, according to size.

Scraper—A local name given to parties who pick up the ore left on dumps.

Sheave—A wheel with grooved circumference, over which a rope is turned, either for the transmission of power or for hoisting.

Shot—A drill-hole charged and fired; injured by a shot.

Silicate—An ore containing about 50 per cent of zinc when pure.

Slime—Silt containing very fine ore, which passes off in the water from the jigs.

Slag—The gangue of the ore with the fluxes which are added in the furnace, and which combine to make a mass that is easily melted, which blows off, leaving the lead or other metal in a free state in the furnace.

Smittem—Fine gravel-like ore, occurring free in mud openings, or derived from the breaking of the ore in blasting.

Smithsonite—Zinc carbonate, carrying 56 per cent of zinc when pure.

Speiss—A compound of arsenic, iron and sulphur added to the charge sometimes to extract the nickel and cobalt in the ore.

Stuff—A common expression among lead and zinc miners when referring to minerals.

String-pump—A system of pumping whereby the motion of the engines is transmitted to the pumps by timbers or stringers bolted together.

Stopping—After a heading has been driven, the underlying ore is mined out by stopping.

Tailings—Waste rock, dirt, etc., left after the minerals have been extracted.

Trolley—A small four-wheeled truck used for carrying the ore bucket underground.

Tift—Calcite, or carbonate of lime.

Tuyere—The tubes through which air is forced into a furnace.

Tub—Ore bucket used in hoisting.

Wash place—A place where the ores are washed and separated from the waste, usually applied to places where hand-jigs are used.

Zinc ores—The various ores of zinc may be divided into: 1st, the sulphide ores, or zinc blende—these are termed "black jack," "rosin jack," "steel jack," etc., from the color. The ore, when pure, carries 67 per cent zinc. 2. The oxidized ores, "calamine," or the silicates of zinc known as "silicate," and "smithsonite," the carbonate of zinc also generally called as silicate. These ores carry about 50 per cent of zinc.

PART THIRD

REPORT ON

IRON MINES

FOR YEAR ENDING JUNE 30, 1892.

REPORT.

The iron industry of the State is decreasing each year, to such an extent as to cause a depressed feeling among those interested.

During the past year 126,521 tons of ore were produced, against 138,356 tons for the preceding year, showing a decrease of 11,835 tons. The decrease is attributed to the low prices and limited demand for the ore. Owing to the depression, some companies have been compelled to reduce their working force.

The Iron Mountain Company in St. Francois county produced more than 62 per cent of the State's entire output. The other more important companies are: Meramec Iron Company, of Crawford county, Midland Blast Furnace Company, with mines in Dent county, Missouri, Iron Company and Sligo Furnace Company, also of Dent county, and St. Louis Ore and Steel Company, of Iron county.

Some of the above-named companies have a large quantity of ore in stock at the mines, which can be put upon the market on short notice. Pilot Knob mines, which have been large producers for several years past, have done but little during the past two or three years, owing to the main body of ore having been exhausted.

Several ore banks are being operated in Phelps, Crawford and Howell counties, and the product used in the manufacturing of paints. But as the demand for the ore for this purpose is limited, the mining operations are necessarily small.

The following table will show the names of operators or companies, location of mines by counties, number of mines in operation, men and machinery employed, together with the product and the average price received per ton for the ore; and following the table we give, by counties, a partial description of each mine, and a statement as to the condition in which they were found on dates of inspection:

TABLE XVIII—SHOWING TONNAGE AND VALUE OF OUTPUT OF IRON MINES, YEAR ENDING JUNE 30, 1892.

CRAWFORD COUNTY.

Operator.	Address.	No. of mines producing ore.	Machinery in use.		Employees.			Average wages of employees.				Total No. of tons mined.	Average price per ton.	Total value of the year's output.
			Boilers	Pumps	Miners	Other employees.	Total employees.	Bosses.	Miners.	Laborers.	Engineers.			
Meramec Iron Co.	Midland.	1	4	2	44	9	53	....	....	....	....	18,790	\$2 43	\$83,068 90

DENT COUNTY.

Midland Blast Furnace.	Midland (Crawford county)	..	..	..	25	..	25	..	..	..	..	10,100	1 75	17,675 00
Missouri Iron Co.	Salem.	2	2	2	20	5	25	..	..	..	..	7,454	1 60	11,926 00
Sligo furnace	Sligo	7,240	1 60	11,584 00

FRANKLIN COUNTY.

Julian Pickens	Dry Branch.	333	2 25	749 25
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HOWELL COUNTY.

D. Carson Iron Co	West Plains	1	15	2	17	320	2 00	640 00
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IRON COUNTY.

St. Louis Ore and Steel Co.	St. Louis	1	2	..	25	2	27	7,049	2 07	14,591 43
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PHELPS COUNTY.

E. W. James.....	2	6	2	8	450	900 00
Wm. James	1	4	3	7	816	1822 00
St. James.....						
St. James.....						

ST. FRANCOIS COUNTY.

Iron Mountain Co.	Iron Mountain	5	6	5	130	74	204	.....	78,969	1 79	141,000 00
Totals.....	.....	<u>13</u>	<u>14</u>	9	<u>269</u>	<u>97</u>	<u>366</u>	.....	<u>126,621</u>	<u>1 85</u>	<u>234,003 68</u>

CRAWFORD COUNTY.

Production, 13,790 tons.

Meramec Iron Mining company—E. T. Herndon, general manager. This mine is located at Cherry Valley, about 6 miles northeast of Midland; connected with the Salem branch of the Frisco railroad by a switch.

This deposit of ore was encountered near the surface and has been followed to a depth of more than 100 feet. Inspection of the mine was made June 23 and we found about 45 or 50 men employed, and most of the output was being stocked owing to the limited demand for the ore.

A new incline plane had recently been made, extending from near the engine-house to bottom of pit, which has greatly improved the hoisting facilities.

Wages of employes are from \$1.10 to \$1.50 per day; houses furnished to married men free of rent.

During the past year there have been 13,790 tons of ore of 2000 pounds produced, against an output of 40,065 tons for the preceding year.

Wm. J. Sankey—A deposit of bituminous coal was opened up by this gentleman a year or two ago, located about two miles east of Slago station on the branch road leading to Slago furnace. Two shafts have been sunk upon the deposit and considerable coal taken out to supply local trade.

It dips from about 30° to perpendicular, and has been followed for about 55 yards. One peculiar feature of the deposit is an abrupt change in its course. It was struck near Flat branch and followed 120 feet northwest; here it changed its course to due west, and has been followed about 50 feet in that direction. The coal contains considerable sulphur and slakes very readily on being exposed to the weather. It is not supposed that the deposit extends over any great amount of territory.

DENT COUNTY.

Production, 24,794 tons.

Midland Blast Furnace company—Mr. B. B. Reagan, manager. Mine located at Condray, and connected with the Salem branch of the Frisco railway by a switch.

The mine has been in operation several years, during which time it has produced about 95,000 tons of ore, but not more than one half

of the product has been marketed, the remainder being in stock at the mine. The ore here, like many of the other banks in the county, was struck near the surface, therefore worked by an open cut, to a depth of 80 feet. Some little drifting, however, has been done during the past year or two.

The ore is shipped to Midland, and smelted at the company's blast furnace.

From 25 to 30 men are employed, whose wages are from \$1.00 to \$1.25 per day of 10 hours.

Missouri Iron company—E. B. Sankey manager. Mine located about one mile south of Salem, and connected with the Salem branch of the Frisco railroad by a switch.

Work had been suspended inside, prior to our inspection, and the workmen were employed sinking a new slope under the old one. This was necessary on account of a squeeze which had occurred in the old slope, partially closing it in.

The ore was struck near the surface several years ago, and the mine put into actual operation in 1873, since which time probably 245,000 tons of ore have been produced.

About 25 men are employed, whose wages are from \$1.00 to \$1.50 per day.

The Jamison bank, located about 3 miles southwest of Salem, is also owned by this company, but only a small amount of ore has been produced by it during the past year, owing to the limited demand for the product.

Slago Furnace company—H. A. Crawford, president, and E. L. Foot, manager. This company owns and is operating what is known as the "Craig" bank, in Crawford county, and Plank bank, in Dent county.

The Craig bank is located near Slago station. It has been operated for several years, but only in a limited manner. At date of inspection (June 25), only a few men were employed. The deposit now being worked seems to dip to the southwest, and runs very irregular.

The Plank bank is located about 7 miles west of Howe's station, and is connected with the Salem branch of the Frisco railroad by a switch.

Mine was idle at date of our visit, caused by the recent heavy rains flooding it; therefore no inspection could be made of the inside workings. However, an effort was being made to drain the mine so as to resume operation again. The company was sinking another shaft, which was down 172 feet below the surface. Mr. Needler, mine super-

intendent, informed us that this shaft would be sunk to a second level 40 feet below the level worked in the old shaft. These shafts were sunk to work out a body of ore which extends back under the embankment from the main deposit.

The output is shipped to Sligo, and smelted at the company's smelter. The two mines together furnish employment to about 35 or 40 men; wages of employes are from \$1.00 to \$1.50 per day.

HOWELL COUNTY.

Production, 320 tons.

D. Carson Iron company—Mine known as the "Lemons bank." It is located about 3 miles southwest of West Plains, and connected with the Kansas City, Ft. Scott & Memphis railroad by a switch.

Mr. D. Carson, manager, writes us that the mine has been idle most of the past year on account of small demand for the ore. This is the only ore-producing mine in the county.

FRANKLIN COUNTY.

Production, 333 tons.

Several iron deposits are known to exist in this county, some of which are now or have been operated in a small manner. A company under the name of Anaconda Copper and Iron company, with C. J. Kostaba, president, and Charles Schultz, superintendent, has been organized and opening is up a mine about 4 miles east of Dry Branch station. At date of inspection (June 21) they were erecting a concentrating plant for treating the copper ore, which they claim exists in paying quantities. The shaft was partially filled with water at date of our visit, therefore we did not see much of the ore body. No ore has been shipped from the mine during the past year.

Julian Pickles and others are operating a mine about 3 miles south of Dry branch, but only in a small way—most of the product being used in the manufacturing of paints. Copper is also found in this mine, but we are not advised as to its merchantable value or the extent of the deposit.

IRON COUNTY.

Production, 7049 tons.

St. Louis Ore & Steel company—Mine located at Pilot Knob, but general office of company at St. Louis. The property went into the hands of a receiver in 1890, E. A. Hitchcock being appointed.

At date of inspection (June 1, 1892), work was confined to an open cut on the north slope of the mountain and about half way up the same, the old mine near the top of the mountain having been worked out and abandoned in 1890.

The ore is of the specular hematite variety and runs from 48 to 60% metallic iron, and contains but little phosphorus. For this reason it has long been noted as a good ore for the manufacturing of Bessemer steel.

Work was suspended last September, and the mine was idle until about the 1st of May, hence the output has not been near so large as it was for the preceding year.

About 25 to 30 men are employed at the mine, whose wages are from \$1.25 to \$1.50 per day for ten hours' work.

PHELPS COUNTY.

Production, 1266 tons.

E. W. James—Is operating the Reed bank, located about 7 miles west of St. James, in section 31, township 37, range 6, west. The mine has only been operated in a small way during the past year, and we are advised that all the ore that has been mined has been utilized in the manufacturing of paints.

William James—Mine located several miles southeast of St. James, in section 2, township 37, and range 6, west. The output during the past few years has been small, owing to depreciation in price. We are informed that most of the ore during the past five years has been used in making paints.

Several other ore deposits occur in this county, but owing to the limited demand for the product, they are not being operated.

ST. FRANCOIS COUNTY.

Production, 78,969 tons.

Iron Mountain company—Chas. C. Maffitt, president, and Chas. A. Pilley, secretary and manager.

Mine located at Iron Mountain, in section 31, township 35 north, and range 4 east.

These mines have been in operation for a number of years, during which time about 3,000,000 tons of ore have been produced, but the output has been gradually decreasing during the past few years, due to the limited demand for the ore.

We were informed at date of inspection that no less than 171,000 tons of ore were in stock at the mines, as the result of an over-production, and for this reason all the night-work in the mines was suspended about one year ago, throwing 50 men out of employment.

The plant is well equipped with good machinery of ample capacity to do the work required. A machine shop and foundry is run in connection with the mines, where all their tools are repaired and castings made.

About 210 men and boys are employed in and about the mines, whose wages are from \$1.15 to \$1.80 per day—underground men receiving from \$1.35 to \$1.80 per day, while the outside workmen are paid from \$1.15 to \$1.35 for same time.

The following named mines and openings were in operation during the past year :

Shaft No. 1—This is probably the largest producing mine owned by the company. It is equipped with good hoisting machinery, which was in good condition at date of inspection (May 31). The ore dips to the south from the bottom of shaft at an angle of 10° to 14°, therefore a slope was driven from a point near the bottom of shaft, following the ore body. This slope has been driven for a distance of more than 1400 feet. Ore is brought up the hill by two stationary engines, one located at the top of slope and the other at a point about one-half way down. Near where the slope intersects the main level (or the level upon which the shaft was sunk), the ore body was 25 to 40 feet in thickness, but is thinning out as it is followed down the slope. The mine is dry and fairly well ventilated; the exhaust from the mining machines, hoisting engines and pumps, which are run by compressed air, greatly assists ventilation. The mine furnishes employment to about 40 men.

Shaft No. 2—Is also a steam plant; shaft 180 feet deep. The principal part of the ore is mined in an open cut, which lies just north of

the shaft, and brought through a tunnel from the cut to shaft bottom and hoisted out. The ore in the open cut has been followed from the surface. Mine was idle at date of inspection, caused by the heavy rains which had fallen a few days before.

Incline No. 2—Most of the ore produced was being mined in No. 3 slope, but hoisted out of this mine. The roof overlying the ore is not good. This may be attributed to the ore body lying so near the surface. About 25 men were employed at date of inspection.

Ore was also being worked in two or three open cuts, and several men were employed digging surface ore at different places.

LIST OF IRON MINE OPERATORS.

Operating during the past year, with location of mine and postoffice address.

CRAWFORD COUNTY.

Name of operator or company.	Postoffice.	Mine located near
Meramec Iron Mining Co.....	Midland	Midland.....

DENT COUNTY.

Midland Blast Furnace Co.....	Midland (Crawford Co.)	Condray
Missouri Iron Co.....	Salem.....	Salem.....
Sligo Furnace Co	Sligo.....	Sligo.....

FRANKLIN COUNTY.

Julian Pickles	Dry Branch Station...	Dry Branch Station..
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HOWELL COUNTY.

D. Carson Iron Co.....	West Plains.....	West Plains.....
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IRON COUNTY.

St. Louis Ore and Steel Co.....	St. Louis	Pilot Knob.....
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PHELPS COUNTY.

E. W. James	St. James	St. James.....
William James.....

ST. FRANCOIS COUNTY.

Iron Mountain Co.....	Iron Mountain.....	Iron Mountain.....
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MINING LAWS OF MISSOURI.

CHAPTER 115.

ARTICLE I—Mines and mining.

II—Safety and inspection of mines.

ARTICLE I.

MINES AND MINING.

SECTION

- 7081. Rights of miners and owners of mining lands—condition of permits.
- 7085. Forfeiture.
- 7086. Tender of payment.
- 7087. Notice to owner or lessee.
- 7088. Sale of ore.
- 7089. Injunction or restraining orders—notice of application to dissolve.
- 7040. Affidavit of course of drift and order to be made.
- 7041. Order to be read.
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SECTION

- 7048. Testimony on application—bond, etc.—time granted.
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- 7053. Application of article to mining companies.
- 7054. Screening coal before weighing prohibited.
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- 7056. Penalty for using false scales.
- 7057. Shall apply to loaders in certain mines.
- 7058. Checks redeemable in money or goods, etc.
- 7059. Employees to be paid monthly, etc.
- 7060. Refusal to redeem orders—penalty.

SEC. 7034. *Rights of miners and owners of mineral lands—condition of permits.*—

When any person owning real estate in this state, or any person having a leasehold interest in such real estate for mining purposes by lease from the owner thereof, duly acknowledged and recorded in the county wherein the land lies, shall permit any person or persons, other than their servants, agents or employees, to enter and dig or mine thereon for lead ore or other minerals, with the consent of such owner or owners or lessee, he or they shall keep a printed statement of the terms, conditions and requirements upon which such lands may be mined or prospected, and the time during which the right to mine or prospect thereunder shall continue, posted or hung up in a conspicuous place, in plain, legible characters, in the principal office or place of business of such person or company in the county in which said lands are situated, or in a county contiguous thereto, and shall deliver to any person mining or prospecting, or about to mine or prospect on said lands, and requesting it, a printed copy of such statement. All persons digging or mining on said lands, after the posting up of such statement, shall be deemed to have agreed to and accepted the terms thereof, and shall, together with such owner or lessee, be bound thereby, and upon failure or refusal to comply with the terms, conditions and requirements of such statement, he or they shall forfeit all right thereunder,

and the owner or lessee, as aforesaid, of such lands, may re-enter thereon and take possession of the same; nor shall the receipt of any ore or mineral by any such owner or lessee, after any such forfeiture has been incurred, be deemed or taken as a waiver of such forfeiture. (R. S. 1879, § 6441—*a.*)

SEC. 7035. *Forfeiture.*—Whenever any such owner or lessee of real estate shall permit any person or persons, other than their servants, agents or employees, to enter and dig for lead ore or other minerals on such real estate, with his consent, but without such owner or lessee complying with the provisions of section 7034, and such person or persons having so entered upon said lands by the permission or consent of such owner or lessee as aforesaid, and having in good faith dug or opened any shaft, mine, quarry, prospect or deposit of mineral, or extended or opened from any shaft or mine any room, drift, entry or other excavation, he or they shall have the exclusive right as against such owner or lessee giving such permit or consent, and against any person claiming by, through or under such owner or lessee, to continue to work, mine and dig such shaft, mine, prospect or deposit of mineral so dug or opened by him or them as aforesaid, in said real estate, with a right of way over such lands for the purpose of such mining, for the term of three years from the date of the giving of such consent or permit: *Provided, however,* that if such person or persons, in each case so mining as aforesaid, shall fail or neglect to work or cause to be worked such shaft, mine, quarry, prospect or deposit of mineral for ten days, not including Sundays, in any one calendar month, after commencing said work, he or they shall forfeit all rights to work, mine or hold the same as against such owner or lessee, unless such failure or neglect was caused by unavoidable circumstances, or by the act of such owner or lessee or his agent, or unless such owner or lessee consent thereto: *Provided further,* that such person or persons, so mining as aforesaid, shall pay to the owner or lessee of said lands giving such permit or consent the royalty for mining thereon, at least once every month, if demanded by such owner or lessee, by delivering the same to him at or near the mouth or opening of such mine, shaft or quarry, or at the nearest usual place of business of such owner or lessee, or at any other place that may be agreed upon by such miner and owner or lessee; which said royalty, unless otherwise agreed upon by them, shall be the same in kind and proportionate amount as is paid by others mining the same kind of ore or mineral on said lands to such owner or lessee, or the value of such royalty in cash; and if there be no other person mining on said lands on terms prescribed by such owner or lessee, then he or they shall pay to such owner or lessee the same rate and kind of royalty on lead ore or minerals taken out by him or them as is paid by miners on lands nearest thereto belonging to other persons, or the value of such royalty in cash. Such owner or lessee of any real estate shall have a lien on all minerals taken or dug therefrom for the royalty due thereon until the same is paid; and if any such person or persons so mining shall refuse or fail to pay such royalty to such owner or lessee, or his agent, when demanded as aforesaid, he or they shall thereby forfeit the right to work such mine, shaft, quarry, prospect or deposit of mineral, and the said owner or lessee may thereupon enter and take possession of the same. (R. S. 1879, § 6442.)

SEC. 7036. *Tender of payment.*—Any such person or persons who, by the permission or consent of the owner or lessee of any real estate, and having the right to mine thereon, and having entered and dug or mined thereon any lead ore or other mineral, shall have the right to the exclusive possession of such ore or min-

(*a*) The statement in this section amounts to a license, revocable upon condition broken, and when forfeited proprietor may re-enter and take possession. 74 Mo. 178.

eral, except the royalty thereon, which shall be paid as hereinbefore provided, until he or they shall be paid or tendered by such owner or lessee of such real estate the then highest market price in cash paid by such owner or lessee for the same kind of ore or mineral dug or mined on said lands, and if no other such ores or minerals are at the time being dug or mined on said lands and sold to such owner or lessee, then the highest price paid for such ore or mineral dug on lands nearest thereto shall be paid or tendered by such owner or lessee in such case; and upon such payment or tender, the absolute right to the possession of such lead ore or other mineral so dug out and mined under the provisions of the next preceding section, and for which such payment or tender shall have been made, shall vest in such owner or lessee. (R. S. 1879, § 6443.)

SEC. 7037. *Notice to owner or lessee.*—If any person or persons having dug or mined lead ore or other mineral, and having the same in his or their possession, and having offered to deliver such mineral according to contract, or paid or tendered the royalty, if any, due thereon, or the value of such royalty in cash, to such owner or lessee of said real estate, or to his agent, shall serve or cause to be served a notice in writing upon such owner or lessee or his agent, by delivering to him a copy thereof, or by leaving a copy thereof at the usual place of abode of such owner, lessee or agent, with some member of the family over the age of fifteen years, stating in such notice the amount of lead ore or other mineral he or they have ready for delivery, and requiring such owner, lessee or agent to receive and pay for the same, the said owner or lessee shall, within five days after the service of such notice, receive and pay for such lead ore or other mineral which the said person or persons digging or mining the same may deliver to him, not exceeding the amount named in the notice; and in such case, if such owner or lessee fail or refuse within the time aforesaid to pay for such lead ore or mineral delivered or offered to be delivered to him as aforesaid at the said price, then in that event the said person or persons who dug and mined the same shall thereupon acquire an absolute title to such lead ore or mineral, and may thereupon dispose of the same to any person or in any manner he or they may choose. (R. S. 1879, § 6444.)

SEC. 7038. *Sale of ore.*—All lead ore or other mineral, dug or mined in or upon the lands of any person in this state, shall be deemed and held to be the absolute property of the owner or lessee of such lands, except in cases it is modified, changed or transferred by express contract; and any person who shall unlawfully sell or convert to his own use, or remove or dispose of, or in any manner make away with or conceal any such ore or mineral, so as to deprive the owner thereof of the same, shall be deemed guilty of grand or petit larceny, according to the value of such ore or mineral. (R. S. 1879, § 6445.)

SEC. 7039. *Injunction or restraining orders—notice of application to dissolve.*—No injunction or restraining order shall be granted by any court or by any judge thereof to enjoin or restrain the working of any mine or mines, or in any manner to interfere with the same, except upon notice first being given to the person working or operating said mine or mines, and sought to be enjoined or restrained, which notice shall be served by delivering to such person a copy thereof, or by leaving a copy thereof at his usual place of abode with a member of the family over the age of fifteen years, at least five days before the day set for the hearing of the application for the injunction; and the court or judge granting such injunction or restraining order shall have the power, upon good cause being shown, to dissolve, vacate or modify any such injunction or restraining order at any time after the same shall have been granted, whether in term time or vacation: *Provided*, that the party applying to such court or judge to dissolve, vacate or modify any such injunction

or restraining order shall give due notice to the opposite party of such intended application. (R. S. 1879, § 6446.)

SEC. 7040. *Affidavit of course of drift and order to be made.*—When any owner, tenant or sub-tenant of a lot or lots or tract of land shall file with any justice of the peace within the county in which said lot or lots or tract of land may be situated his or her affidavit, or the affidavit of any other creditable person for them, stating that from knowledge, information or belief, the party or parties owning, controlling or working the adjoining lot or lots or tract of land, and upon which said party or parties are sinking shafts, mining, excavating and running drifts, and that said drifts in which said parties are digging, mining and excavating mineral ore or veins of coal extend beyond the lines and boundaries of said lot or lots or tract of land, owned, controlled or worked by them, and have entered in and upon the premises of the party or parties making said affidavit, or for whom said affidavit is made, the justice of the peace, after first being tendered his lawful fees, shall issue his written order and deliver or cause the same to be delivered to the county surveyor or his deputy, commanding him, after his reasonable fees have been tendered, to proceed without delay to survey said drift by entering any and all shafts upon said lot or lots or tract of land that he (the surveyor) may see fit, for the purpose of ascertaining the course and distance of said drift or drifts, and to locate the same upon the surface. (R. S. 1879, § 6447.)

SEC. 7041. *Order to be read.*—The surveyor shall, before entering upon said duty, read said order to the party or parties owning, controlling or working any shaft or shafts on said lot or lots or tract of land. (R. S. 1879, § 6448.)

SEC. 7042. *Refusal to obey order a misdemeanor.*—If said party or parties owning, controlling or working said shaft or shafts on said lot or lots or tract of land shall refuse, hinder or prevent said county surveyor or his deputy and his assistant from entering said shaft or shafts or drifts, to make the survey so ordered by the justice of the peace, and every person so offending shall, on conviction, be adjudged guilty of a misdemeanor, and punished by imprisonment in the county jail for a term of not exceeding one year, or by fine not exceeding three hundred dollars, or by both said fine and imprisonment. (R. S. 1879, § 6449.)

SEC. 7043. *Owner or lessee shall drain mine, etc.*—When any person owning any real estate in this state, or any person or persons having a leasehold therein for the purpose of mining for lead or zinc ore thereon by lease from such owner, shall open such real estate for mining purposes, and shall permit any person or persons other than their agents, servants or employees to enter and dig or mine for lead or zinc ores thereon, and shall make any rule or contract whereby any pump-rent or royalty is reserved unto said land owner or lessee for the drainage of the land so mined, and shall fail or refuse to drain any such land or mining lot to the full depth to which the laborers are working or seeking to work, but prevented by water, then and in such event, such owner or lessee thereof shall not be entitled to collect or retain any pump-rent or royalty so reserved as aforesaid for any ores taken from said mine or lot, below the depth of the water level in said mine or lot, so long as said owner or lessee shall fail or refuse to drain said mine, nor shall such land owner or lessee be entitled to forfeit any right to hold and mine said lot so long as work is prevented therein by reason of water accumulated therein, on account of any failure to drain said mine by such land owner or lessee, any rule, contract or agreement to the contrary notwithstanding. (New section.)

SEC. 7044. *Scrapping for ore prohibited, etc.—penalty.*—It shall be unlawful for any person to take or in any manner receive or obtain any lead or zinc ore by means of gleaning or culling, commonly called “scrapping,” without first having

obtained the written consent of the person having possession and control of the mine from which said ores are to be taken ; and it shall be unlawful for any person or company of persons to purchase, or in any manner to receive any lead or zinc ore which may have been stolen or taken by means of culling or gleaming, commonly called "scrapping," without such written consent as aforesaid, knowing that said ores have been so stolen or taken without written consent, as herein provided. Any person violating the provisions of this section, on conviction, shall be punished by fine of not more than one hundred dollars, or by imprisonment in the county jail not more than one year, or by both such fine and imprisonment ; and the inadequacy of the price paid for such ore, the quantity purchased, or received, and the fact that the person from whom such ores may have been purchased or received is not regularly engaged in running or operating mines for such ores, may be shown, and shall be received as *prima facie* evidence of guilty knowledge of the person so purchasing or receiving such ores : *Provided, however,* that nothing herein contained shall be so construed as to prevent any person from gleaming, culling or scrapping for ores about his own mine, nor to prevent any person from purchasing such ores when the same have been obtained in such manner by the owner or operator of any such mine. (New section.)

SEC. 7045. *Indemnity bond required to mine in certain cities, etc—violation a misdemeanor—penalty.*—No person, company or corporation shall hereafter sink a shaft, mine, tunnel, excavate or drift for coal, or take out any coal of any kind within the corporate limits or designated boundaries of any city, town or village in this state containing one thousand inhabitants or more, without having first applied and filed, and have approved, an indemnity bond as hereinafter provided for ; and any person or persons violating the provisions of this section, and any member or stockholder or officer of any company or corporation who shall violate the provisions of this section, shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be punished by fine of not less than five hundred dollars, or imprisonment in the county jail for not less than six months, or by both such fine and imprisonment. (R. S. 1879, § 6450.)

SEC. 7046. *Notice of intention to mine—publication required.*—Every person, company or corporation desiring to carry on any of the mining operations provided for in the preceding section shall give at least thirty days' notice of such intention by notice printed and published in some newspaper printed in such town, city or village wherein such mining operations are proposed to be carried on, or if no newspaper be printed in such city, town or village, then in some newspaper printed in said county, or if no newspaper be printed in such county, then by written or printed hand-bills posted up in six public places in the city, town or village wherein such mining operations are proposed to be carried on. Such notice shall contain an accurate description of the locality where such mining operations are to be carried on, giving the number of lot and block, and shall also state the nature of such mining operations, and name some day of the term of the next circuit court in said county, thereafter to be holden, when such person, company or corporation will offer for filing and approval the indemnity bond hereinafter provided for. (R. S. 1879, § 6451.)

SEC. 7047. *Petition to circuit court—court to fix and approve bond.*—On the day mentioned in such notice, the persons, company or corporation proposing to carry on such mining operations shall present their petition to said circuit court, setting out the locality of the proposed mines and the nature and extent of the proposed mining operations, and shall also file with such petition the title papers of such person or company or corporation to the lands on which such mining operations are pro-

posed to be carried on, showing either the fee simple title of such land in such company, or the right to mine beneath or in such land, and shall also contain the names of all persons to be offered as security upon the mining bond of such persons, company or corporation, and shall pray the court to fix and approve the mining bond of such persons or corporation. (R. S. 1879, § 6452.)

SEC. 7048. *Testimony on application—bond, etc.—time granted.*—The court may, upon such application, hear testimony upon all the matters involved in such application, including testimony upon the solvency and responsibility of the sureties offered, and may hear testimony from any parties interested in the lots and lands in the neighborhood of such proposed mining operations, and if the court is satisfied that the proposers own the land or mining privileges under the land described in their petition, the court shall fix the amount of the bond to be given by such proposers, such bond to be in no case for less than one thousand dollars; and upon the giving and approval of such bond so fixed by the court, the court shall enter its order authorizing the mining operations specified in said petition, and upon the localities therein named, and not elsewhere, for the space of two years, unless in the meanwhile revoked. (R. S. 1879, § 6453.)

SEC. 7049. *Bond required.*—Such bond shall be signed by the proposers, and by not less than two sureties, to be approved by said court, residents of the county wherein such mining is to be carried on, and shall be made payable to the state of Missouri, and conditioned that the principal in said bond shall carry on the mining operations proposed in the petition in a careful manner, and the said parties shall not mine, dig, excavate nor take coal nor earth from nor under any land or lots than that described in the said bond, and shall pay all damages that may be sustained by any and all persons by reason of the violation of any of the conditions of said bond, and any and all charges, fines and penalties that may be levied, assessed against or imposed upon the said proposers, their agents, servants, stockholders, officers or employes, by reason of any violation of the conditions of said bond or any of the provisions of this law. (R. S. 1879, § 6454.)

SEC. 7050. *Written permission of property owner—violation, misdemeanor—penalty, fines, etc.*—Any person or persons who shall in person or by their servant, agent or employe, dig, excavate, mine, tunnel or drift upon or under the lands or lots of another, within the incorporate limits or designated boundaries of any city, town or village in this state, and every officer and stockholder that shall either authorize or permit its servants, agents or employes to dig, excavate, mine, tunnel or drift upon or under the lands or lots of another within such limits or boundaries of such city, town or village, without the written permission of the owner or owners of such land or lots, shall be deemed guilty of a misdemeanor, and shall be punished, on conviction, for every such offense, by fine of not less than five hundred dollars, with costs, which fine and costs, if not paid within five days after conviction, may be sued for and recovered against the parties and sureties on the mining bond of such persons, company or corporation liable for such acts, in a suit upon such bond, in the name of the state of Missouri, to the use of the county in which such offense is committed; such fine, when collected, shall be paid, one-half to the owner of the property injured by such offense and the other half into the school fund of such county; but no such conviction shall be a bar to the owner of such property prosecuting a suit on said bond to his own use for the damages sustained by any such offense. Every such conviction, whether appealed from or not, shall work a forfeiture of the authority to mine granted such person, company or corporation liable, and they shall not proceed further with the operations, except by making application and giving a new bond as in the first instance. (R. S. 1879, § 6455.)

SEC. 7051. *Costs attending notice.*—The costs attending the giving notice, making application and receiving mining privileges shall all be paid by the person, company or corporation making the same, and no such privilege shall take effect until all such costs be paid. (R. S. 1879, § 6456.)

SEC. 7052. *Diagram of mines, etc., to be filed in court.*—At each term of the circuit court, during the continuance of any mining license, every person, company or corporation carrying on such mining operations shall, at their own expense, cause to be made by the county surveyor of the county where such mines are located, and filed with the court, under oath of such surveyor, a complete and true diagram of such mines, showing with reference to the boundaries of such mines, and the lots and lands of neighboring owners, the extent of such mines, their drifts, tunnels and excavations, giving the length and breadth of each drift, bank and tunnel, so as to fully inform the court and parties in interest of the extent and character of such mining operations. Such plats and diagrams shall remain on file with the clerk of such court, and shall not be removed by any one from the files of such court. Any failure to file the diagram and plat herein provided for, or to make such diagram show all the particulars herein provided for, shall work a forfeiture of the mining privileges of such person, company or corporation, which forfeiture the court shall, on the motion of any party in interest, declare on three days' notice to the party holding such license or privilege. (R. S. 1879, § 6457.)

SEC. 7053. *Application of article to mining companies.*—In no case shall the eight preceding sections of this article be so construed as to apply to persons, companies or corporations engaged in mining for lead, zinc or other ores of minerals, except coal. (R. S. 1879, § 6458, amended.)

SEC. 7054. *Screening coal before weighing prohibited.*—It shall be unlawful for any mine owner, lessee or operator of coal mines in this state, employing miners at bushel or ton rates, or other quantity, to pass the output of coal mined by said miners over any screen or other device which shall take any part from the value thereof, before the same shall have been weighed and duly credited to the employe sending the same to the surface, and accounted for at the legal rate of weights as fixed by the laws of Missouri. (Laws 1885, p. 207.)

SEC. 7055. *Weighman shall take an oath, etc., penalty.*—The weighman employed at any mine shall subscribe an oath or affirmation before a justice of the peace, or other officer authorized to administer oaths, to do justice between employer and employe, and weigh the output of coal from the mines as herein provided. The miners employed by or engaged in working for any mine owner, operator or lessee of any mine in this state shall have the privilege, if they desire, of employing at their own expense a check-weighman, who shall have like rights, powers and privileges in the weighing of coal as the regular weighman, and be subject to the same oath and penalties as the regular weighman. Said oath or affirmation shall be kept conspicuously posted in the weigh office, and any weigher of coal, or person so employed, who shall knowingly violate any of the provisions of this article, shall be deemed guilty of a misdemeanor, and, upon conviction, shall be punished by fine of not less than twenty-five nor more than one hundred dollars for each offense, or by imprisonment in the county jail for a period not to exceed thirty days, or by both such fine and imprisonment, proceedings to be instituted in any court having competent jurisdiction. (Laws 1885, p. 208, amended, Laws 1887, p. 218, amended.)

SEC. 7056. *Penalty for using false scales.*—Any person or persons having or using any scale or scales for the purpose of weighing the output of coal at mines, so arranged or constructed that fraudulent weighing may be done thereby, or who shall knowingly resort to or employ any means whatsoever, by reason of which such

coal is not correctly weighed and reported in accordance with the provisions of this article, shall be deemed guilty of a misdemeanor, and shall, upon conviction, for each such offense, be punished by a fine of not less than two hundred dollars nor more than five hundred dollars, or by imprisonment in the county jail for a period not to exceed sixty days, or by both such fine and imprisonment, proceedings to be instituted in any court of competent jurisdiction. (Laws 1885, p. 208.)

SEC. 7057. *Shall apply to loaders in certain mines.*—The manner of weighing, as hereinbefore provided for, shall apply to the class of workers in mines known as loaders, engaged in mines wherein the mining is done by machinery, whenever the workmen are under contract to load coal by the bushel, ton, or any quantity the settlement of which is had by weight. (Laws of 1885, p. 208, amended.)

SEC. 7058. *Checks redeemable in money or goods, etc.*—It shall not be lawful for any corporation, person or firm engaged in manufacturing or mining in this state to issue, pay out or circulate for payment of the wages of labor, any order, check, memorandum, token or evidence of indebtedness, payable in whole or in part otherwise than in lawful money of the United States, unless the same is negotiable and redeemable at its face value, without discount, in cash or in goods, wares or merchandise or supplies, at the option of the holder, at the store or other place of business of such firm, person or corporation, or at the store of any other person on whom such paper may be drawn, where goods, wares or merchandise are kept for sale, sold or exchanged; and the person who, or corporation, firm or company which, may issue any such order, check, memorandum, token or other evidence of indebtedness, shall, upon presentation and demand, within thirty days from date or delivery thereof, redeem the same in goods, wares, merchandise or supplies at the current cash market price for like goods, wares, merchandise or supplies, or in lawful money of the United States, as may be demanded by the holder of any such order, memorandum, token or other evidence of indebtedness: *Provided*, that if said corporation, person or firm engaged as specified in this section have a regular pay-day once in every thirty days, then said corporation, person or firm shall not be required to redeem such token or evidence of indebtedness in cash until the first pay-day after the same become payable, as herein provided, and such token or evidence of indebtedness shall be presented for payment in cash only on such pay-days. (Laws 1881, p. 73, amended, Laws 1885, p. 83.)

SEC. 7059. *Employees to be paid monthly, etc.*—The employees of operators of mines mentioned in this article shall be regularly paid at least once in every thirty days, and at no pay-day shall there be withheld of the earnings of any employe any sum to exceed the amount due him for his labor for the four days next preceding any such pay-day. And such operators shall, whenever demand therefor shall be made by any employe, issue to such employe a due-bill for the amount due him up to the day of the demand, which due-bill shall be negotiable, whatever the form thereof shall be, and shall be redeemed by such operator in cash or its equivalent, at the option of the holder, on any pay-day, if the same shall be presented for redemption by any holder thereof; and any such operator failing or refusing to pay his employes, or to issue to them his due-bills as in this section provided, shall become immediately liable to any such employe in double the sum due such employe at the time of such failure or refusal, to be recovered by civil action in the name of such employe in any court of competent jurisdiction of the state. And no employe within the meaning of this article shall be deemed to have waived any right accruing to him under this section by any contract he may make contrary to the provisions hereof. (New section.)

SEC. 7060. *Refusal to redeem orders—penalty.*—Any officer or agent of any corporation, or any person, firm or company engaged in the business of manufacturing or mining in this state, who by themselves or agent shall issue or circulate in payment for wages of labor any order, check, memorandum, token or evidence of indebtedness, payable in whole or in part otherwise than in lawful money of the United States, without being negotiable and payable at the option of the holder in goods, wares, merchandise, supplies or lawful money of the United States, as required by section 7058 of this article, or who shall fail to redeem the same when presented for payment within thirty days from date of delivery thereof, by said company or its agent at his or their office or place of business, in lawful money of the United States, or who shall compel or attempt to coerce any employe of any such corporation, person, firm or company to purchase goods, wares, merchandise or supplies from any particular person, firm or corporation, shall be guilty of a misdemeanor, and on conviction thereof shall be fined not less than ten nor more than five hundred dollars for each and every such offense. (Laws 1885, p. 84.)

ARTICLE II.

SAFETY AND INSPECTION OF MINES.

SECTION

- 7061. Maps of mines to be prepared, etc.
- 7062. Inspector to make maps if owner fails, etc.
- 7063. Escapement shafts, when and how constructed, etc.
- 7064. Ventilation, fire-damp.
- 7065. Bore-holes.
- 7066. Signaling—hoisting—certain minors not to work, etc.
- 7067. Regulations for hoisting.
- 7068. Boilers—fencing entrances—signals, etc.

SECTION

- 7069. Accidents—duty and power of inspector, etc.
- 7070. Fines, how recovered.
- 7071. Governor to appoint inspector, etc.
- 7072. Duties of inspector—reports.
- 7073. Inspector may enter mines at any time, etc.
- 7074. In case of injury or death, right of action.
- 7075. Rules of working mines—penalty.
- 7076. Prop-timbers.
- 7077. Explosives to be kept in strong box, etc.

SEC. 7061. *Maps of mines to be prepared, etc.*—The owner, agent or operator of each and every mine in this state, employing ten or more men, shall make or cause to be made, at the discretion of the Inspector or other person acting in that capacity, an accurate map or plan of the workings of such mine and each and every vein thereof, showing the general inclination of the strata, together with any material deflections in the said workings and the boundary lines of said mine, and deposit a true copy of said map or plan with the clerk of the county court of each county wherein may be located the said mine; which said map or plan shall be so filed or deposited within three months after the time when this article shall take effect, and a copy of such map or plan shall also be kept for inspection at the office of the said mine; and during the month of January of each and every year after this article shall have taken effect, the said owner, agent or operator shall furnish the Inspector and the clerk of the county court as aforesaid with a statement, and a further map or plan of the progress of the workings of such mine, continued from the last report to the end of the month of December next preceding, and the inspector shall correct his map or plan of said workings in accordance with the statement and map or plan thus furnished; and when any mine is worked out or abandoned, that fact shall be reported to the inspector, and the map or plan of such mine in the office of the clerk of the county court shall be carefully corrected and verified. (Laws 1887, p. 219.)

SEC. 7062. *Inspector to make map if owner fails—cost.*—Whenever the owner, agent or operator of any mine shall neglect, fail or refuse to furnish the said inspector and clerk as aforesaid with a statement, the map or plan or addition thereto, as provided in the first section of this article, at the times and in the manner therein provided, the said inspector is hereby authorized to cause an accurate map or plan of the workings of such mine to be made at the expense of the said owner, agent or operator, and the cost thereof may be recovered by law from said owner, agent or operator, in the same manner as other debts, by suit in the name of the inspector and for his use. (Laws 1887, p. 219.)

SEC. 7063. *Escapement shafts, when and how constructed, etc*—In all coal mines that are now or have been in operation prior to the first day of January, 1887, and which are worked by or through a shaft, slope or drift, and in which more than ten miners are employed in each twenty-four hours, if there is not already an escapement shaft to each and every said mine, or communication between each and every mine and some other contiguous mine, then there shall be an escapement shaft or other communication, such as shall be approved by the mine inspector, making at least two distinct means of ingress and egress for all persons employed or permitted to work in such mine. Such escapement shaft or other communication with a contiguous mine aforesaid shall be constructed in connection with every vein or stratum of coal worked in such mine, and the time to be allowed for such construction shall be one year when such mine is under one hundred feet in depth, two years when such mine is over one hundred feet and under three hundred feet, and three years when it is over three hundred feet and under four hundred feet, and four years when it is over four hundred feet in depth, and five years for all mines over five hundred feet, from the time this article goes into effect; and in all cases where the working force of one mine has been driven up to or into the workings of another mine, the respective owners of such mine, while operating the same, shall keep open a roadway at least two and one-half feet high and four feet wide, thereby forming a communication as contemplated in this article, and for a failure to do so shall be subject to the penalty provided for in section 7069 of this article, for each and every day such roadway is unnecessarily closed. Each and every such escapement shaft shall be separated from the main shaft by such extent of natural strata as shall secure safety to the men employed in such mines—such distance to be left to the discretion and judgment of the mine inspector or person acting in that capacity; and in all coal mines that shall go into operation for the first time after the first day of January, 1888, such an escapement or other communication with a contiguous mine, as aforesaid, shall be constructed within one year after such mine shall have been put into operation. And it shall not be lawful for the owner, agent or operator of any such mine as aforesaid to employ any person to work therein, or permit any person to go therein for the purpose of working, except such persons as may be necessary to construct such an escapement shaft, unless the requirements of this section shall have first been complied with; and the term “owner” used in this article shall mean the immediate proprietor, lessee or occupant of any mine, or any part thereof, and the term “agent” shall mean any person having, on behalf of the owner, the care or management of any mine, or any part thereof: *Provided*, nothing in this section shall be construed to extend the time allowed by law for constructing escapement shaft. (Laws 1887, p. 219, amended.)

SEC. 7064. *Ventilation—fire-damp.*—The owner, agent or operator of every mine, whether operated by shaft, slope or drift, shall provide and maintain for every such mine a sufficient amount of ventilation, to be determined by the inspector, at the rate of one hundred cubic feet of air per man per minute, measured at the foot of

the downcast, which shall be forced and circulated to the face of every working place throughout the mine, so that said mine shall be free from standing gas of whatsoever kind; and in all mines where fire-damp is generated, every working place where such fire-damp is known to exist shall be examined every morning with a safety lamp by a competent person, before any other persons are allowed to enter. The ventilation required by this section may be produced by any suitable appliances, but in case a furnace shall be used for ventilating purposes, it shall be built in such a manner as to prevent the communication of fire to any part of the works, by lining the upcast with incombustible material for a sufficient distance up from said furnace. (Laws 1887, p. 220.)

SEC. 7065. *Bore-holes.*—The owner, agent or operator shall provide that bore-holes shall be kept twenty feet in advance of the face of each and every working place, and, if necessary, on both sides, when driving toward an abandoned mine and part of a mine suspected to contain inflammable gases or to be inundated with water. (Laws 1887, p. 220.)

SEC. 7066. *Signaling—hoisting—certain minors not to work, etc.*—The owner, agent or operator of every mine operated by shaft shall provide suitable means of signaling between the bottom and the top thereof, and shall also provide safe means of hoisting and lowering persons in a cage covered with boiler iron, so as to keep safe, as far as possible, persons descending into and ascending out of said shaft; and such cage shall be furnished with guides to conduct it on slides through such shaft, with a sufficient break on every drum to prevent accident in case of the giving out or breaking of machinery; and such cage shall be furnished with spring catches, intended and provided, as far as possible, to prevent the consequences of cable breaking or the loosening or disconnecting of the machinery; and no props or rails shall be lowered in a cage while men are descending into or ascending out of said mine: *Provided*, that the provisions of this section in relation to covering cages with boiler iron shall not apply to coal mines less than one hundred feet in depth, where the coal is raised by horse-power. No male person under the age of twelve years, or female of any age, shall be permitted to enter any mine to work therein; nor shall any boy under the age of fourteen years, unless he can read or write, be allowed to work in any mine. Any party or person neglecting or refusing to perform the duties required to be performed by the provisions of this article shall be deemed guilty of a misdemeanor, and punished by a fine in the discretion of the court trying the same, subject, however, to the limitations as provided by section 7069 of this article. (Laws 1887, p. 221, amended.)

SEC. 7067. *Regulations for hoisting.*—No owner, agent or operator of any mine operated by shaft or slope shall place in charge of any engine whereby men are lowered into or hoisted out of the mines, any but an experienced, competent and sober person, not under eighteen years of age; and no person shall be permitted to ride upon a loaded cage or wagon used for hoisting purposes in any shaft or slope, and in no case shall more than twelve persons ride on any cage or car at one time, nor shall any coal be hoisted out of any mine while persons are descending into such mine; and the number of persons to ascend out of or descend into any mine on one cage shall be determined by the inspector; the maximum number so fixed shall not be less than four nor more than twelve, nor shall be lowered or hoisted more rapidly than five hundred feet to the minute. (Laws 1887, p. 221, amended.)

SEC. 7068. *Boilers—fencing entrances—signals, etc.*—All boilers used in generating steam in and about coal mines shall be kept in good order, and the owner, agent or operator, as aforesaid, shall have the said boiler examined and inspected by

hydrostatic pressure and warm water, by a competent boiler-maker or other qualified person, as often as once every six months, and the result of every such examination shall be certified in writing to the mine inspector; and the top of each and every shaft, and the entrance of each and every immediate working vein shall be securely fenced by gates properly covering and protecting such shaft and entrance thereto; and the entrance to every abandoned slope, air or other shaft, shall be securely fenced off; and every steam boiler shall be provided with a proper steam gauge, water gauge and safety valve, and all under-ground self-acting or engine planes or gangways on which coal cars are drawn and persons travel, shall be provided with some proper means of signaling between the stepping places and the end of said planes or gangways, and sufficient places of refuge at the sides of such planes or gangways shall be provided at intervals of not more than twenty feet apart. (Laws 1887, p. 221, amended.)

SEC. 7069. *Accidents—duty and power of inspector, etc.*—Whenever loss of life or serious personal injury shall occur by reason of any explosion or of any accident whatsoever, in or about any mine, it shall be the duty of the person having charge of such mine to report the facts thereof without delay to the state mine inspector, and if any person is killed thereby, to notify the coroner of the county also, or in his absence or inability to act, any justice of the peace of said county; and the said inspector shall, if he deem it necessary from the facts reported, immediately go to the scene of said accident and make suggestions and render such assistance as he may deem necessary for the safety of the men; and the inspector shall investigate and ascertain the cause of such explosion or accident and make a report thereof, which he shall preserve with the other records of his office; and to enable him to make such investigation, he shall have the power to take depositions, compel the attendance of witnesses and administer oaths or affirmations to them; and the cost of such investigation shall be paid by the county court of the county in which such accident shall have occurred, in the same manner as costs of coroners' inquests are now paid. And a failure on the part of the person having charge of any mine in which any such accident may have occurred to give notice to the inspector or coroner, as provided for in this section, shall subject such person to a fine of not less than one hundred nor more than three hundred dollars, to be recovered of him in the name of the state of Missouri, before any justice of the peace of such county wherein the mine is situate and the accident occurred; and such fine, when collected, shall be paid into the county treasury for the use and benefit of said county. (Laws 1887, p. 222.)

SEC. 7070. *Fines, how recovered.*—In all cases in which punishment is not provided for by fine under this article, for a breach of any of its provisions, the fine for the first offense shall not be less than fifty nor more than two hundred dollars, and for the second offense not less than two hundred nor more than five hundred dollars, to be recovered in any court of the state having competent jurisdiction. (Laws 1887, p. 222.)

SEC. 7071. *Governor to appoint inspector, etc.*—The governor shall appoint an inspector of mines, who shall serve for two years, and shall have a practical mining experience, but not be interested in any mine, and shall receive a salary of \$1500 per annum and his actual traveling expences. He shall have his office in the office of the commissioner of labor statistics, and when not inspecting mines act as a clerk in said office, giving his whole time to the state. (Laws 1887, p. 222, amended.)

SEC. 7072. *Duties of inspector—reports.*—The inspector provided for in this article shall see that every necessary precaution is taken to insure the health and

safety of the workmen employed in any of the mines in this state, that the provisions and requirements provided for in this article be faithfully observed and obeyed, and the penalties of the law enforced. He shall also collect and tabulate in his report, to be made to the bureau of labor statistics, on the 15th day of October of each year, the extent of workable mining lands in this state, by counties; also, the manner of mining, whether by shaft, slope or drift, the number of mines in operation, the number of men employed therein, the amount of capital invested, and the amount of mineral, coal, etc., produced. (Laws 1887, p. 222.)

SEC. 7073. *Inspector may enter mines at any time, etc.*—It shall be lawful for the inspector provided for in this article to enter, examine and inspect any and all mines and machinery belonging thereto, at all reasonable times, by day or by night, but so as not to obstruct or hinder the necessary workings of such mine, and the owner, agent or operator of every such mine is hereby required to furnish all necessary facilities for such entering, examination and inspection; and if the said owner, agent or operator aforesaid shall refuse to permit such inspection, or to furnish the necessary facilities for such entry, examination and inspection, the inspector shall file his affidavit setting forth such refusal before the judge of the circuit court in said county in which said mine is situated, either during the term of the court or during vacation, and obtain an order on such owner, agent or operator so refusing as aforesaid, commanding him to permit and furnish such facilities for the inspection of such mine, or to be adjudged to stand in contempt of court and punished accordingly; and if the said inspector shall, after examination of any mine and the works and machinery pertaining thereto, find the same to be worked contrary to the provisions of this article, or unsafe for the workmen therein employed, said inspector shall, through the circuit attorney of his county, or any attorney in case of his refusal to act, acting in the name and on behalf of the state, proceed against the owner, agent or operator of such mine, either separately or collectively, by injunction, without bond, after giving at least two days' notice to such owner, agent or operator; and said owner, agent or operator shall have the right to appear before the judge to whom application is made, who shall hear the same on affidavits and such other testimony as may be offered in support as well as in opposition thereto; and if sufficient cause appear, the court, or judge in vacation, by order, shall prohibit the further working of any such mine in which persons may be unsafely employed contrary to the provisions of this article, until the same shall have been made safe and the requirements of this article shall have been complied with; and the court shall award such costs in the matter of said injunction as may be just; but any such proceedings so commenced shall be without prejudice to any other remedy permitted by law for enforcing the provisions of this article. (Laws 1887, p. 223.)

SEC. 7074. *In case of injury or death, right of action.*—For any injury to persons, or property occasioned by any willful violation of this article, or willful failure to comply with any of its provisions, a right of action shall accrue to the party injured for any direct damages sustained thereby; and in case of loss of life by reason of such willful violation or willful failure as aforesaid, a right of action shall accrue to the widow of the person so killed, his lineal heirs or adopted children, or to any person or persons who were, before such loss of life, dependent for support on the person or persons so killed, for a like recovery of damages sustained by reason of such loss of life or lives. (Laws 1887, p. 223.)

SEC. 7075. *Rules of working mines—penalty.*—Any miner, workmen or other person who shall knowingly injure any water gauge, barometer, air-course or brattice, or shall obstruct or throw open any air-ways, or carry any lighted lamps or

matches into places that are worked by the light of safety lamps, or shall handle or disturb any part of the machinery of the hoisting engine, or open a door to a mine and not have the same closed again, whereby danger is produced, either to the mine or those at work therein, or who shall enter into any part of the mine against caution, or who shall disobey any order given in pursuance of this article, or who shall do any willful act whereby the lives and health of persons working in the mine, or the security of the mine or miners, or the machinery thereof, is endangered, shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be punished by fine or imprisonment, at the discretion of the court. (Laws 1887, p. 224.)

SEC. 7076. *Prop timbers*.—The owner, agent or operator of any mine shall keep a sufficient supply of timber, when required to be used as props, so that the workmen may at all times be able to properly secure the said workings from caving in, and it shall be the duty of the owner, agent or operator to send down all such props when required. (Laws 1887, p. 224.)

SEC. 7077. *Explosives to be kept in strong box, etc.*—All miners or other persons employed in or about a mine, using gun or blasting powder or other explosive, shall have and keep a strong box in which all surplus gun or blasting powder or other explosive in the mine shall be kept, excepting so much only as is necessary for immediate use. These boxes shall be kept locked, and not opened unless it be to put in or take out powder; nor must these strong (or powder) boxes be nearer than one hundred feet to the place of blasting. And in all dry and dusty coal mines of mines discharging light carbonated hydrogen gas, shot-firers must be employed to fire all shots after the employes and other persons have retired from the mine: *Provided, however*, that the above section shall refer only to mines working ten or more men. (New section.)

WAGES OF LABOR.

AN ACT to amend section 7059, of the Revised Statutes for the State of Missouri for 1889, concerning mines and mining.

Be it enacted by the General Assembly of the State of Missouri, as follows:

SECTION 1. That section 7059, of chapter 115, article 1, of the Revised Statutes of Missouri of 1889, be amended by striking out the word "thirty," between the words "every" and "days," in the third line of said section, and inserting in lieu thereof the word "fifteen;" so that said section, when amended, shall read as follows:

Section 7059. *Employes to be paid semi-monthly, etc.*—The employes of operators of mines mentioned in this article shall be regularly paid at least once in every fifteen days, and at no pay-day shall there be withheld [any] of the earnings of any employe. And such operators shall, whenever demand therefor shall be made by any employe, issue to such employe a due-bill for the amount due him up to the day of the demand, which due-bill shall be negotiable, whatever the form thereof shall be, and shall be redeemed by such operator in cash or its equivalent, at the option of the holder, on demand, if the same shall be presented for redemption by any holder thereof; and any such operator failing or refusing to pay his employes, or to issue to them his due-bills, as in this section provided, shall become immediately liable to any such employe in double the sum due such employe at the time of such failure or refusal, to be recovered by civil action, in the name of such employe, in any court of competent jurisdiction of the state. And no employe, within the meaning of this article, shall be deemed to have waived any right accruing to him under this section by any contract he may make contrary to the provisions hereof.

Approved April 20, 1891.

INSPECTION.

AN ACT to amend section 7074, chapter 115, article 2, of the Revised Statutes of the state of Missouri, relating to the safety and inspection of mines.

Be it enacted by the General Assembly of the State of Missouri, as follows :

SECTION 1. That section 7074, chapter 115, article 2, of the Revised Statutes of the state of Missouri, be and the same is hereby amended by striking out the word "willful" wherever the same occurs in said section—namely, after the word "any," in line two, after the word "or," in line three, and after the words "such" and "or," in line five—so that said section, when amended, shall read as follows :

Section 7074. For any injury to persons or property occasioned by any violation of this article or failure to comply with any of its provisions, a right of action shall accrue to the party injured for any direct damages sustained thereby ; and in case of loss of life by reason of such violation or failure as aforesaid, a right of action shall accrue to the widow of the person so killed, his lineal heirs or adopted children, or to any person or persons who were, before such loss of life, dependent for support on the person or persons so killed, for a like recovery of damages sustained by reason of such loss of life or lives: *Provided*, that all suits brought under this article shall be commenced within one year after any cause of action shall have accrued under this article, and not afterward ; and *provided further*, that any person entitled to sue under this section for loss of life or lives may recover any sum not exceeding ten thousand dollars.

Approved April 23, 1891.

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